
Installation and configuration

This chapter describes the installation of the Fiber Remote Multi-IPE Interface unit as a part of a fiber-optic link connecting Meridian 1 to its Remote IPE modules at distances of up to 15 kilometers. It explains how to prepare the site and check the equipment before installing it and how to configure it to the specific traffic requirements.

Quick reference to system installation and configuration

If you are familiar with the system operation and general Meridian 1 installation practices, follow the steps below to speed up the installation of the Fiber Remote Multi-IPE Interface and the Remote IPE at the local and remote sites:

- 1** Take inventory of the equipment by comparing the received equipment against the shipping documents. Refer to Table 2 in the Product Description chapter for Remote IPE components part numbers and their description.
- 2** Plan the superloop and fiber-optic link configuration based on the traffic requirements (blocking or non-blocking traffic) at the Remote IPE site. Refer to:
 - “Engineering guidelines” on page 25,
 - Table 1, “Superloop connection configurations,” on page 7 to specified the number of superloops required, and
 - Table 2, “Equipment required to link Meridian 1 to Remote IPE sites,” on page 8 to select the appropriate Fiber Remote Multi-IPE Interface type based on the number of superloops and the fiber-optic cable type.

- 3** Install the NT8D04 Superloop Network card into a network card slot and connecting the internal superloop cables to the network I/O panel. To identify an empty network card slot, refer to:

 - Table 7, “Meridian 1 modules supporting Superloop Network cards,” on page 43,
 - Table 8, “System cabinet shelves supporting Superloop Network cards,” on page 44,
 - “Installing the Superloop Network card” on page 45 to install the card into its designated card slot, and
 - “Installing cables between the Superloop Network card and the network I/O panel” on page 46 to install cables between J1 and J2 faceplate connectors and the network I/O panel.
- 4** Configure and install the Fiber Remote Multi-IPE Interface unit. Refer to:

 - “Setting S1 and S2 switches at the local site” on page 47 to set the dip-switches S1 and S2, to install the redundant optical connectors, if required, and to install the unit onto the wall or into the shelf and
 - “Installing local superloop cables” on page 61 to connect the cables between the network I/O panel and the SUPERLOOP connectors on the Fiber Remote Multi-IPE Interface unit.
- 5** Install the system monitor, local MMI terminal, and fiber-optic link cables to the Fiber Remote Multi-IPE Interface unit connectors. Refer to:

 - “Connecting local system monitor cables” on page 61,
 - “Installing SDI and local MMI terminal cables” on page 64, and
 - “Connecting the fiber-optic link” on page 68.
- 6** At the remote site, install the Remote IPE equipment. Refer to:

 - “Installing the internal cables to the Remote IPE module” on page 76 and
 - “Setting S1 and S2 switches at the remote site” on page 77.

- 7 Install the external cables to the I/O panel. Refer to:
 - “Installing superloop cables” on page 82,
 - “Connecting the system monitor cable” on page 83,
 - “Connecting the MMI terminal” on page 84, and
 - “Connecting the fiber-optic link to the Remote IPE Module” on page 86
- 8 Configure the Remote IPE local and remote sites. Refer to:
 - “Configuring the cards” on page 90,
 - “Selecting the MMI terminal modes” on page 94,
 - “Configuring the MMI modem” on page 97, and
 - “Configuring the Fiber Remote Multi-IPE Interface” on page 100
- 9 Conduct system acceptance testing. Refer to “Remote IPE acceptance testing” chapter in this manual.

Installation overview

The Remote IPE service over a fiber-optic link can be added to existing Meridian 1 system options 21E, 51, 51C, 61, 61C, 71, 81, and 81C originally installed and operating without Remote IPE, or it can be an integral part of a newly installed Meridian 1 system. It can also be added to existing XT and NT systems equipped to support IPE cards.

The connection of the Remote IPE to the Meridian 1 over the fiber-optic link should begin after:

- A previously installed Meridian 1 system is upgraded to run on generic software X11 release 19 or higher. It should operate correctly.
- A newly installed system using generic software X11 release 21 or higher. It should operate correctly.

To install a new Meridian 1 system or expand an existing one, refer to *Meridian 1 system installation procedures* (553-3001-210). It provides the information on how to install, verify, and maintain the Meridian 1 system.

Adding one or more Remote IPE sites to a Meridian 1 system is treated as a straightforward system expansion, that is, the system should be fully operational before the Remote IPE equipment is installed and connected to Meridian 1. This simplifies installation and fault isolation during installation. To complete the installation of a Remote IPE site, you should perform the preinstallation procedures to prepare the site, install the Fiber Remote Multi-IPE Interface, the fiber-optic link, and install the copper cables between the Fiber Remote Multi-IPE Interface units and Meridian 1 and between remote Fiber Remote Multi-IPE Interface units and the Remote IPEs.

Preinstallation procedures include:

- Preparing the site
- Unpacking and inspecting and taking inventory of the equipment
- Routing and splicing fiber-optic cables to create a fiber-optic link between two sites, if it does not already exist
- Connecting the fiber-optic link to the Fiber Remote Multi-IPE Interface at the Meridian 1 site and the Remote IPE site
- Selecting the Meridian 1 Superloop Network cards for connection to the Fiber Remote Multi-IPE Interface

Installation procedures include:

- Installing the Superloop Network cards in the selected network card slot, if not already installed
- Installing the cables between the J1 and J2 faceplate connectors on the Superloop Network cards and the network I/O panel connectors at the rear of the network module
- Installing the cables between the SL0 through SL3 backplane connectors on the Remote IPE module and the I/O panel connectors at the rear of the module
- Configuring the Fiber Remote Multi-IPE Interface dip-switches and installing the Fiber Remote Multi-IPE Interface unit onto the wall or in the shelf
- Connecting the fiber-optic link to the Fiber Remote Multi-IPE Interface fiber-optic ST-type connectors

- Connecting the external copper cables between the Fiber Remote Multi-IPE Interface unit and Meridian 1 network I/O panel connectors
- Connecting the master system monitor and MMI terminal cables at the local site
- Connecting the external copper cables between the Fiber Remote Multi-IPE Interface unit and the Remote IPE module I/O panel connectors
- Connecting the slave system monitor and MMI terminal cables at the remote site
- Connecting the fiber-optic link to the Fiber Remote Multi-IPE Interface at the Remote IPE site

Preinstallation preparation

Preinstallation preparation consists of preparing the site, unpacking and inspecting components, taking inventory, installing or selecting already installed Superloop Network cards which will support Remote IPE sites, installing the fiber-optic link, and preparing the Remote IPE column for connection to the Fiber Remote Multi-IPE Interface.

Preparing the site

When preparing a site, you must address environmental, structural, and electrical factors. These factors must be considered for the entire system, that is, Meridian 1 and Remote IPE sites. This information is available in:

- *Meridian 1 installation planning* (553-3001-120)
- *Meridian 1 system engineering* (553-3001-151)
- *Meridian 1 power engineering* (553-3001-152)

To prepare the site for Fiber Remote Multi-IPE Interface installation, you must first:

- 1 Install and verify the operation of Meridian 1 without linking Meridian 1 to the Remote IPE site(s). Refer to *Meridian 1 system installation procedures* (553-3001-210).
- 2 Install the Remote IPE column at the remote site, if not already installed. Also refer to *Meridian 1 system installation procedures* (553-3001-210).
- 3 Route and splice the fiber-optic cable between the Meridian 1 site and Remote IPE site(s).

Unpacking and inspection

Unpack and inspect the equipment for damage. When unpacking, follow general precautions recommended by computer and telephone equipment manufacturers:

- Remove items that generate static charge from the installation site.
- Use antistatic spray if the site is carpeted.
- Ground yourself before handling any equipment.
- Remove equipment carefully from its packaging.
- Visually inspect the equipment for obvious faults or damage. Any damaged component must be reported to your sales representative and the carrier who delivered the equipment.
- Do not bend and twist the fiber-optic cables excessively. Make sure that the cable is not bent beyond the specified minimum bending radius of 1.4 inches (3.5 cm) when handled or installed.

Taking inventory

After the equipment has been unpacked and visually inspected, verify that all the equipment is at the site before the installation begins. Equipment received must be checked against the shipping documents. Any shortages must be noted and reported to your sales representative.

Installing the fiber-optic link

If the fiber-optic link already exists, check its fiber-optic link characteristics and the end-to-end loss to determine if the link can support a Fiber Remote Multi-IPE Interface units and, if it can, at what distance between Meridian 1 and the Remote IPE.

Consult your Northern Telecom distributor to learn how to verify that the existing fiber-optic link is suitable for the Fiber Remote IPE application and what equipment to use to do so.

To connect the fiber-optic link to the Fiber Remote Multi-IPE Interface ST optical connectors at Meridian 1 (local) site and the Remote IPE (remote) site, the link fibers must be terminated with ST-type optical connectors.

CAUTION

If you are changing a fiber-optic system to the Fiber Remote Multi-IPE Interface, make sure that you change the fiber-optic link connectors to the appropriate ST-type. The ST-type optical connector must correspond to the type of fibers used in the fiber-optic link i.e. (single-mode or multi-mode). You may also use a fiber-optic adapter cable to adapt the existing connector type to the ST- type if the total link attenuation, including the adapter, does not exceed the maximum acceptable link loss.

Keep the optical connectors absolutely clean. Use pure isopropyl alcohol-treated lint-free wipes to clean the ferrule part of the optical connector and an aerosol duster to blow out dust particles from the adapter part of the optical connector.

Make sure that the ferrules in the optical connectors are properly installed and aligned in their respective adapters. This is particularly critical for the single-mode fibers where tolerances are tighter.

When routing the fiber-optic cables to the Fiber Remote Multi-IPE Interface units, take the following precautions:

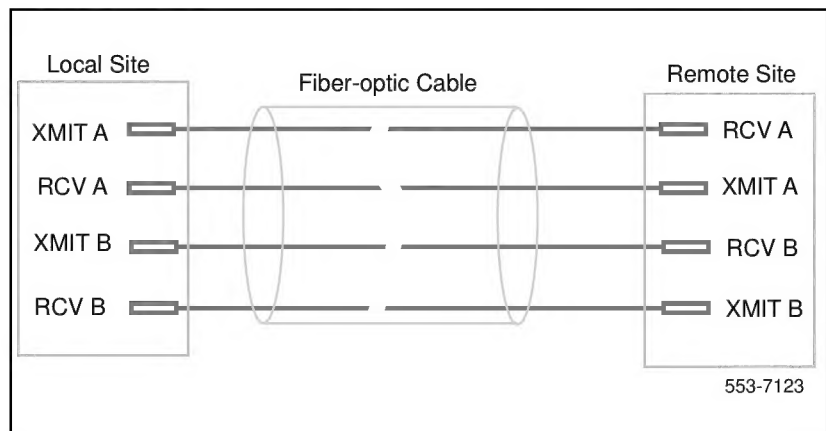
- Do not bend the fiber-optic cable or individual fibers beyond the minimum bending radius specified by the cable manufacturer.

- Protect the exposed parts of the cable and fibers with plastic conduit.
- Terminate each selected fiber with an ST optical connector (a fiber-optic cable may contain more fibers than required by the single or redundant link design). At the fiber management frame, the type of optical connectors used depends on the available frame optical connectors.
- Label optical fibers with XMIT A (transmit) and RCV A (receive) designator behind the ST optical connector for the primary link and XMIT B and RCV B for the redundant link to identify the function of each fiber in the link

Handle fibers with extreme care. Observe a minimum bending radius at all times. Optical connections to the optical units should be finger-tightened only.

The link fiber labeled XMIT A at the remote site must be labeled RCV A at the local site, and the link fiber labeled RCV A at the remote site must be labeled XMIT A at the local site. For a redundant link, label XMIT B at the remote site as RCV B at the local site, and RCV B at the remote site as XMIT B at the local site as shown in Figure 6.

Figure 6
Fiber-optic link



Selecting the Superloop Network card slot

To install the Superloop Network card that supports the Remote IPE application, you must first determine its card slot. The position of the Superloop Network card in Meridian 1 depends on the Meridian 1 system option installed at the local site. The system option determines in what type of module the card will be housed.

Table 7 lists modules that provide network card slots, system options where these modules are used, and card slots where Superloop Network cards can be installed.

Table 7
Meridian 1 modules supporting Superloop Network cards

Modules	System option	Network card slot
NT5D21 Core/Network Module	51C, 61C, 81C	0-7
NT8D11 CE/PE Module	21E	4-9
NT8D35 Network Module	71, 81, 81C	5-10, 11&12 (Note)
NT9D11 Core/Network Module	61C	0&1 (Note), 2-7
NT6D39 CPU/Network Module	51, 61	1&2 (Note), 3-8
Note: Card slots 11 and 12 can be used with NT8D35BA and NT8D35EA vintage Network Modules or Network Modules with NT8D3507 backplane, which are equipped with network hybrids (Hybrid Kit NT5D40AA) instead of BTUs. In older vintage NT8D35 Network Modules, NT9D11 Core/Network Modules, and NT6D39 CPU/Network Modules, a BTU upgrade kit NT5D40AA can be used to replace the BTUs to be able to use the card slots identified with the Note for the installation of the Superloop Network card.		

Table 8 lists NT and XT cabinet shelves that provide network card slots, the systems where these shelves are used, and card slots where network cards can be installed.

Table 8
System cabinet shelves supporting Superloop Network cards

System Shelf	System	Network card slot
Network shelf (QSD39)	NT, XT	3 (Note), 4-10
Network shelf (QSD40)	NT, XT	5-10, 11&12 (Note)
Note: To use these network card slots, a BTU upgrade kit should be used. This kit replaces BTUs with network hybrid units.		

Meridian 1 and fiber-optic equipment installation

To complete the installation of the Fiber Remote Multi-IPE Interface that links Meridian 1 to the Remote IPE equipment, you must:

- Install and verify the operation of the Meridian 1 system, if it is not already installed and operating correctly.
- Identify the network card slots and install the Superloop Network cards in these Meridian 1 network card slots, if these cards are not already installed.
- Install the Fiber Remote Multi-IPE Interface units.
- Connect the Fiber Remote Multi-IPE Interface units to the Meridian 1 I/O panel connectors.
- Connect the fiber-optic link to the Fiber Remote Multi-IPE Interface faceplate ST optical connectors.

Installing and verifying Meridian 1 operation

The Remote IPE facilities can be added to an existing Meridian 1 system running on X11 release 19 or higher, by installing the appropriate electro-optical equipment in the link, installing one or more Remote IPE sites, and linking Meridian 1 with remote sites using single or redundant fiber-optic links.

To install a new Meridian 1 system, follow the instructions in *Meridian 1 system installation procedures* (553-3001-210). It describes how to install a complete Meridian 1 system and how to connect the power, the internal and external communication cables, and subscriber loops.

If a new Meridian 1 system is configured with Remote IPE facilities, the system will normally be assembled at the factory with cards already installed including the Superloop Network cards selected to support the Remote IPE sites over a fiber-optic link. All you would have to do is to connect the Fiber Remote Multi-IPE Interface to the Meridian 1 and the Remote IPE and connect the fiber-optic link between the local and remote Fiber Remote Multi-IPE Interface units. However, if the Superloop Network card is not installed, install it now.

Installing the Superloop Network card

The purpose of the following steps is to instruct you how and where to install the Superloop Network card(s). In a new Meridian 1 system, the cards would have been installed in network card slots at the factory; however, you may have to install additional Superloop Network cards to expand the number of remote sites or replace a defective card.

To install these cards:

- 1** Set the ENB/DIS switch on the Superloop Network card to DIS.
- 2** Pull the Superloop Network card's upper and lower locking device away from the faceplate. While holding the card by these locking devices, insert it into the card guides of the selected network card slot.
- 3** Slide the card into the module until it engages the backplane connector.
- 4** Carefully push the upper and lower locking device levers towards the faceplate to insert the card connector into the backplane connector and lock the card in place.
- 5** Set the ENB/DIS switch on the Superloop Network card to ENB and observe the LED on the card as it performs self-tests. The LED should blink three times and then stay ON until enabled by software. When enabled by software, the LED turns OFF permanently, if operational.

Installing cables between the Superloop Network card and the network I/O panel

To connect Meridian 1 superloops to the Fiber Remote Multi-IPE Interface and the fiber-optic span, you must first install the internal cables connecting J1 and J2 Superloop Network card faceplate connectors to the network I/O panel.

In a new Meridian 1 system with Remote IPE, these cables are normally installed in the factory, however, for an existing Meridian 1 system that is being expanded using the Remote IPE, these cables must be installed at the site. To do this:

- 1 Remove the back cover from the network module where the Superloop Network cards are installed.
- 2 Plug the 24-pin connector of the NT8D88AD cable into the Superloop Network card J1 or J2 faceplate connector.

Note: To determine which faceplate connectors to use and how many superloops are required for your specific application, consult Table 1 “Superloop connection configurations” on page 7.

- 3 Route the cable to the back of the module to the network I/O panel.
- 4 Install the 24-pin Centronics NT8D88AD cable connector into the network module I/O panel connector cutouts. Use longer screws supplied in the kit with the cable assembly.
- 5 Repeat steps 2 through 4 for each superloop connection required in your application.

- 6 To install the internal cables between the Superloop Network card in an NT or XT system shelf and the I/O connector housing at the top of the cabinet:
 - Plug the 24-pin connector of the NT8D88AD cable into the Superloop Network card J1 or J2 faceplate connector.
 - Route the other end of the cable to the top of the cabinet.
 - Install the 24-pin Centronics NT8D88AD cable connector into the I/O connector housing cutouts at the top of the cabinet. Use extender cable if the NT8D88AD cable is too short.
 - Repeat the above three steps for each internal superloop cable.

Setting S1 and S2 switches at the local site

Before you can install a Fiber Remote Multi-IPE Interface unit, you must:

- Configure the Fiber Remote Multi-IPE Interface using S1 and S2 dip-switches
- Install redundant fiber-optic connectors, if required

Table 9 lists functions controlled by dip-switches S1 and S2. It also shows how to set these switched to configure the Fiber Remote Multi-IPE Interface.

Table 9
Fiber Remote Multi-IPE Interface configuration

Function Selection	Switch and Position	Switch Setting
For single Fiber Remote Multi-IPE Interface unit	S1 Position 1 and Position 2	ON (at local and remote sites)
Fiber Remote Multi-IPE Interface at the MMI terminal or modem end of the daisy-chain	S1 Position 1 Position 2	ON OFF
Fiber Remote Multi-IPE Interface at the SDI port end of the daisy-chain	S1 Position 1 Position 2	OFF ON
Fiber Remote Multi-IPE Interface in the middle of the daisy-chain	S1 Position 1 Position 2	OFF OFF
Fiber Remote Multi-IPE Interface address in a daisy-chain and system monitor address	S1 Positions 3-8	Refer to Table 10
Physical location of the Fiber Remote Multi-IPE Interface	S2 Position 1	ON-Remote site OFF-Local site
Reserved for future use	S2 Positions 3-8	OFF
Note: Switch position: ON= Down and OFF= Up for S1 and S2 switches.		

Table 10 lists the available addresses for each Fiber Remote Multi-IPE Interface unit in a daisy-chain and the system monitor address. Each Fiber Remote Multi-IPE Interface must have a unique address from 0 to 63.

Table 10
Fiber Remote Multi-IPE Interface and system monitor address selection table (Part 1 of 3)

Address	S1 Pos 3	S1 Pos 4	S1 Pos 5	S1 Pos 6	S1 Pos 7	S1 Pos 8
00	OFF	OFF	OFF	OFF	OFF	OFF
01	ON	OFF	OFF	OFF	OFF	OFF
02	OFF	ON	OFF	OFF	OFF	OFF
03	ON	ON	OFF	OFF	OFF	OFF
04	OFF	OFF	ON	OFF	OFF	OFF
05	ON	OFF	ON	OFF	OFF	OFF
06	OFF	ON	ON	OFF	OFF	OFF
07	ON	ON	ON	OFF	OFF	OFF
08	OFF	OFF	OFF	ON	OFF	OFF
09	ON	OFF	OFF	ON	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF
12	OFF	OFF	ON	ON	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF
16	OFF	OFF	OFF	OFF	ON	OFF
17	ON	OFF	OFF	OFF	ON	OFF
18	OFF	ON	OFF	OFF	ON	OFF
19	ON	ON	OFF	OFF	ON	OFF
20	OFF	OFF	ON	OFF	ON	OFF
21	ON	OFF	ON	OFF	ON	OFF
22	OFF	ON	ON	OFF	ON	OFF
23	ON	ON	ON	OFF	ON	OFF
24	OFF	OFF	OFF	ON	ON	OFF

Table 10
Fiber Remote Multi-IPE Interface and system monitor address selection table (Part 2 of 3)

Address	S1 Pos 3	S1 Pos 4	S1 Pos 5	S1 Pos 6	S1 Pos 7	S1 Pos 8
25	ON	OFF	OFF	ON	ON	OFF
26	OFF	ON	OFF	ON	ON	OFF
27	ON	ON	OFF	ON	ON	OFF
28	OFF	OFF	ON	ON	ON	OFF
29	ON	OFF	ON	ON	ON	OFF
30	OFF	ON	ON	ON	ON	OFF
31	ON	ON	ON	ON	ON	OFF
32	OFF	OFF	OFF	OFF	OFF	ON
33	ON	OFF	OFF	OFF	OFF	ON
34	OFF	ON	OFF	OFF	OFF	ON
35	ON	ON	OFF	OFF	OFF	ON
36	OFF	OFF	ON	OFF	OFF	ON
37	ON	OFF	ON	OFF	OFF	ON
38	OFF	ON	ON	OFF	OFF	ON
39	ON	ON	ON	OFF	OFF	ON
40	OFF	OFF	OFF	ON	OFF	ON
41	ON	OFF	OFF	ON	OFF	ON
42	OFF	ON	OFF	ON	OFF	ON
43	ON	ON	OFF	ON	OFF	ON
44	OFF	OFF	ON	ON	OFF	ON
45	ON	OFF	ON	ON	OFF	ON
46	OFF	ON	ON	ON	OFF	ON
47	ON	ON	ON	ON	OFF	ON
48	OFF	OFF	OFF	OFF	ON	ON
49	ON	OFF	OFF	OFF	ON	ON
50	OFF	ON	OFF	OFF	ON	ON
51	ON	ON	OFF	OFF	ON	ON
52	OFF	OFF	ON	OFF	ON	ON

Table 10
Fiber Remote Multi-IPE Interface and system monitor address selection table (Part 3 of 3)

Address	S1 Pos 3	S1 Pos 4	S1 Pos 5	S1 Pos 6	S1 Pos 7	S1 Pos 8
53	ON	OFF	ON	OFF	ON	ON
54	OFF	ON	ON	OFF	ON	ON
55	ON	ON	ON	OFF	ON	ON
56	OFF	OFF	OFF	ON	ON	ON
57	ON	OFF	OFF	ON	ON	ON
58	OFF	ON	OFF	ON	ON	ON
59	ON	ON	OFF	ON	ON	ON
60	OFF	OFF	ON	ON	ON	ON
61	ON	OFF	ON	ON	ON	ON
62	OFF	ON	ON	ON	ON	ON
63	ON	ON	ON	ON	ON	ON

Setting the S1 dip-switch

Dip-switch S1 defines the connection of the Fiber Remote Multi-IPE Interface to the MMI terminal, the SDI port, and the daisy-chain address of each Fiber Remote Multi-IPE Interface unit. Refer to Figure 11 “Daisy-chaining of multiple Fiber Remote Multi-IPE Interface units” on page 68. It also defines the system monitor address at the remote site.

To configure the S1 dip-switch, refer to Figure 7 and follow the steps below:

- 1 Eject the motherboard from the metal enclosure by pushing the ejector tabs outward away from the Fiber Remote Multi-IPE Interface faceplate.
- 2 Configure the Fiber Remote Multi-IPE Interface using S1 dip-switch, refer to Table 9 and Table 10 for instructions.
 - **For a single unit.** If Fiber Remote Multi-IPE Interface units are not daisy-chained, set dip-switch S1 positions 1 and 2 to ON.
 - **First unit in the chain.** For the first Fiber Remote Multi-IPE Interface in the daisy-chain the SDI connector connects to the MAINT connector of the following Fiber Remote Multi-IPE Interface and its MAINT connector connects to the MMI terminal through the A0656212 MMI Adapter. For the first Fiber Remote Multi-IPE Interface in the daisy-chain must be set dip-switch S1 position 1 to ON and position 2 to OFF, as shown in Table 9.
 - **Unit in the middle of the chain.** For Fiber Remote Multi-IPE Interface units in the middle of the daisy-chain, dip-switch S1 positions 1 and 2 must be set to OFF.
 - **Last unit in a daisy-chain.** For the Fiber Remote Multi-IPE Interface at the end of the daisy-chain, where it connects the SDI connector to the SDI port in Meridian 1 and the MAINT connector to the SDI connector on the next Fiber Remote Multi-IPE Interface in the daisy-chain. For the last Fiber Remote Multi-IPE Interface in the daisy-chain that connects to the SDI port, dip-switch S1 position 1 must be set to OFF and position 2 must be set to ON, as shown in Table 9.

Note: To assign a unique address to each Fiber Remote Multi-IPE Interface in a daisy-chain at the local site, set S1 positions 3-8 as shown in Table 10. At the Remote IPE site, use this table to assign a unique system monitor address of the Fiber Remote Multi-IPE Interface, which is connected to the system monitor card in the pedestal of the Remote IPE column. The system monitor address must be the same as the address of the Fiber Remote Multi-IPE Interface connected to the system monitor card in the pedestal.

Setting the S2 dip-switch

Dip-switch S2 defines the physical location of the Fiber Remote Multi-IPE Interface unit in the fiber-optic link.

To specify the physical location of the Fiber Remote Multi-IPE Interface units:

- 1** For the local Fiber Remote Multi-IPE Interface units, set dip-switch S2 position 1 to OFF.
- 2** For the remote Fiber Remote Multi-IPE Interface units, set dip-switch S2 position 1 to ON, as shown in Table 9.

Installing redundant fiber-optic link option

The redundant fiber-optic link is optional. Unless your system configuration requires a redundant fiber-optic link, you do not have to install the following hardware.

To install the redundant fiber-optic link connectors, you must install the daughterboard that corresponds to the type of fiber used in the link. Refer to Figure 7 for installation details.

The daughterboard types are:

- A0634492 Redundant Option for single-mode fiber
- A0634493 Redundant Option for multi-mode fiber

To install the daughterboard:

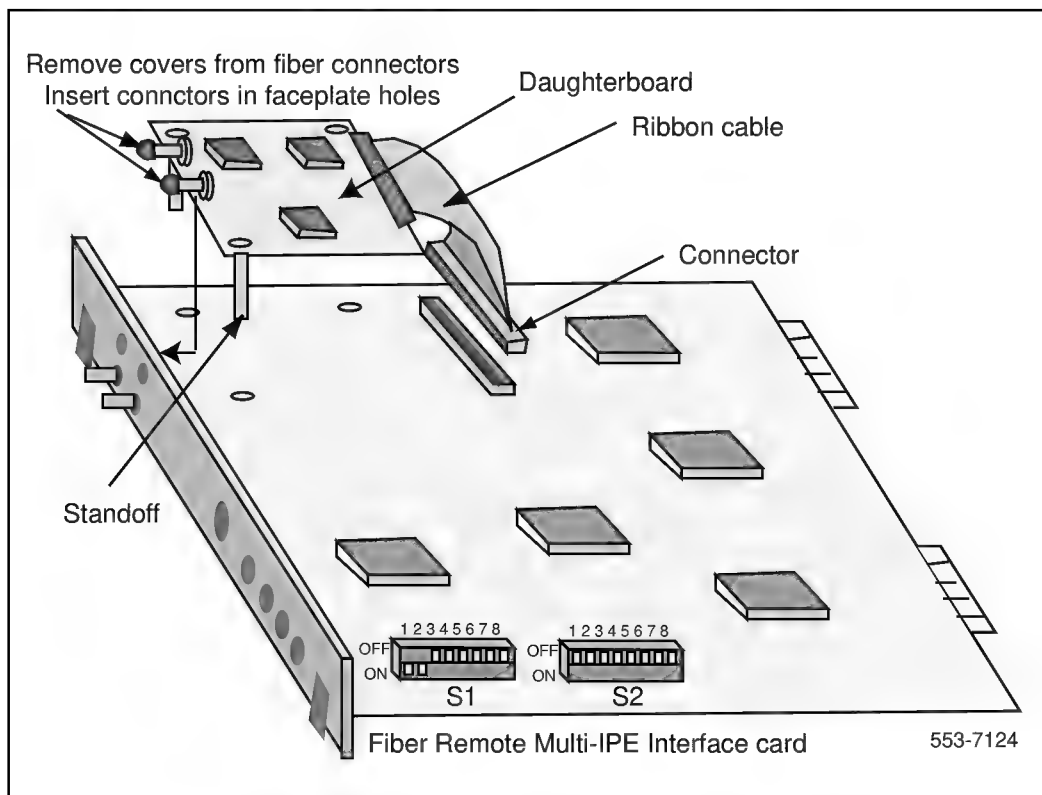
- 1** Remove the two filler plugs on the Fiber Remote Multi-IPE Interface faceplate labeled XMIT B and RCV B.

Note: The Fiber Remote Multi-IPE Interface mother board has already been exposed during switch setting procedure.

- 2** Locate four screw holes near the top left-hand corner of the motherboard.
- 3** Insert the fiber-optic ST-type connectors into the openings on the faceplate and install the daughterboard onto the four standoffs. Tighten the four screws into the standoffs to secure the daughterboard.
- 4** Hand tighten the nuts onto the ST connectors. Do not overtighten.
- 5** Plug the ribbon cable from the daughterboard to the connector on the motherboard.
- 6** Close the Fiber Remote Multi-IPE Interface unit by pushing faceplate in until is flush with the front of the enclosure and no slack is in the ejector tabs.
- 7** Install the Fiber Remote Multi-IPE Interface unit into the rack-mounted shelf or onto the wall, as shown in Figure 8 and Figure 9.

Figure 7 shows the installation of the daughterboard onto the motherboard of the Fiber Remote Multi-IPE Interface unit.

Figure 7
Installing the redundant fiber-optic link option



Mounting the Fiber Remote Multi-IPE Interface units

The Fiber Remote Multi-IPE Interface unit can be installed onto a wall or into a rack-mounted shelf that accommodates up to six Fiber Remote Multi-IPE Interface units. These units must be install within 30 feet from the Meridian 1 and the Remote IPE, because the cables connecting the Fiber Remote Multi-IPE Interface units to the Meridian 1 equipment are 30 feet long. The power cable between the Fiber Remote Multi-IPE Interface unit and its AC/DC Power Converter is only 25 feet long.

Two slotted holes are provided at the back of the enclosure to mount the Fiber Remote Multi-IPE Interface unit on the wall such that the faceplate is located on the left-hand-side and the I/O panel at the right-hand-side of the unit.

For multiple Fiber Remote Multi-IPE Interface units, a rack-mounted shelf is provided to house up to six units. This is normally used at the local site, where the possibility of having multiple units is much greater.

Installing multiple Fiber Remote Multi-IPE Interface units into the shelf

The Fiber Remote Multi-IPE Interface units can also be installed into the A0634494 Rack Mounted Shelf. This is practical if you have multiple Fiber Remote Multi-IPE Interface units at the local site. The shelf supports up to six Fiber Remote Multi-IPE Interface units and mounts onto a 19-inch rack using standard 10x32 pan head screws. Refer to Figure 8 for installation illustration.

To install the shelf and the units into the shelf:

- 1 Place the shelf onto a 19-inch rack and use 10x32 pan screws (not included with the shelf) to secure the shelf in place.

Note: If a solid panel is positioned above the shelf, make sure that there is at least four inches of empty space above the shelf. However, if the panel or shelf above has at least 50% airflow capacity, no empty space above the shelf is required.

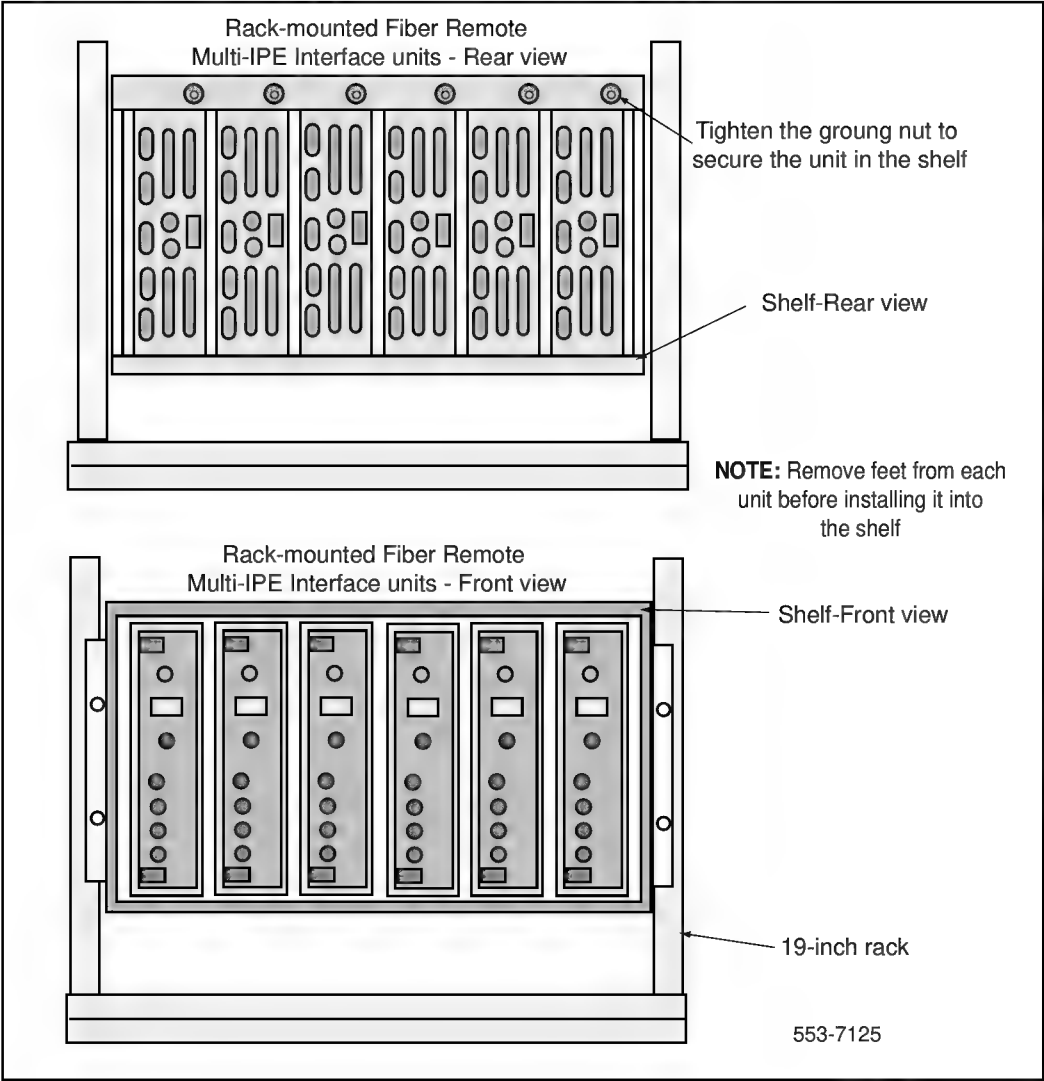
- 2 Install the Fiber Remote Multi-IPE Interface units into the shelf slots by sliding them in from the front of the shelf.

- 3 Allow adequate space in front and the back of the shelf to be able to install the fiber-optic links in the front and the superloop cables in the back.

Note: When installing the fiber-optic cables, make sure that the minimum bending radius does not exceed cable manufacturer's specification. If the bending radius is smaller than recommended, the fiber may be damaged.

Figure 8 illustrates the installation of the Fiber Remote Multi-IPE Interface units on the wall and into a rack-mounted shelf.

Figure 8
The Fiber Remote Multi-IPE Interface unit installation methods



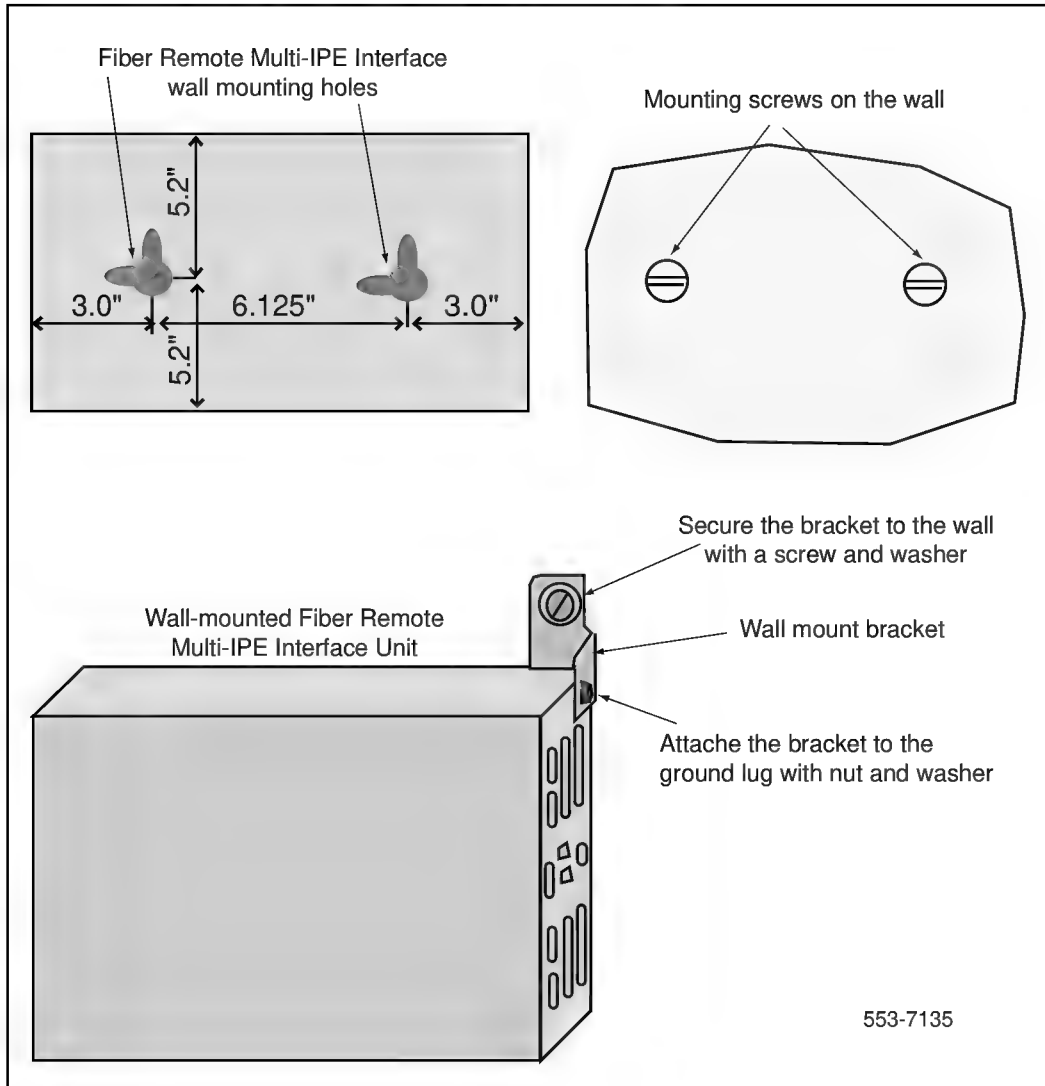
Installing the Fiber Remote Multi-IPE Interface unit onto the wall

To mount the Fiber Remote Multi-IPE Interface unit on the wall refer to Figure 9 and follow these steps:

- 1** Find a location on the wall to give the Fiber Remote Multi-IPE Interface unit enough clearance to install the fiber-optic cables in the front and superloop cables in the back of the unit. Allow for a minimum of six inches of clearance in the front for the fiber-optic cables. Provide a minimum of 13 inches of clearance in the front.
- 2** Position the wall mount template on the wall and use a level to ensure horizontal positioning of the Fiber Remote Multi-IPE Interface unit.
- 3** Mark the three screw holes and the two alignment marks. Drill the screw holes.
- 4** Screw two number 8 screws into the wall board or plywood. The screw heads should be 1/16 inch away from the wall surface to allow you to insert the screw heads into the slotted holes on the bottom of the Fiber Remote Multi-IPE Interface unit. Refer to Figure 8 to see the hole location templet.
- 5** Place the wall mount bracket in the upper rear corner of the Fiber Remote Multi-IPE Interface unit and fasten it to the Ground lug with the attached nut and lock washer.
- 6** Position the Fiber Remote Multi-IPE Interface unit's holes over the two screws on the wall, insert the screws into the holes, and push the Fiber Remote Multi-IPE Interface unit to the left to engage the screws into the narrow of the slots.
- 7** Fasten the top of the wall mount bracket to the wall with the provided screw.

Figure 9 illustrates the installation of the Fiber Remote Multi-IPE Interface unit onto the wall.

Figure 9
Wall-mounting the Fiber Remote Multi-IPE Interface unit



Installing local superloop cables

The number of A0634495 Local Superloop cables required to connect the network I/O panel 24-pin Centronics connectors to the 37-pin D Shell SUPERLOOP connectors on the Fiber Remote Multi-IPE Interface I/O panel depends on the number of superloops required to support the Remote IPE site(s) configuration. Refer to Appendix, Figure 15 for the connection diagram.

Note: Use the superloop connection plan that you completed based on the traffic blocking criteria for Remote IPE segments and Table 1 “Superloop connection configurations” on page 7.

To install these cables:

- 1** Locate all the superloop connectors on the network I/O panel designated to support Remote IPE sites over the fiber-optic link.
- 2** Verify that you have configured and installed the appropriate version of the Fiber Remote Multi-IPE Interface unit (number of superloops and type of fiber supported). Refer to Table 2 “Equipment required to link Meridian 1 to Remote IPE sites” on page 8.
- 3** Plug the 24-pin Centronics A0634495 Local Superloop cable connector into the designated 24-pin I/O panel connector in Meridian 1. Fasten balelocks.
- 4** Plug the 37-pin D Shell connector into the appropriate SUPERLOOP connector on the Fiber Remote Multi-IPE Interface unit I/O panel. Tighten screws.
- 5** Repeat steps 3 and 4 for each superloop you have to connect.

Connecting local system monitor cables

The Fiber Remote Multi-IPE Interface unit can be directly connected to a system monitor, or it can be daisy-chained with multiple Fiber Remote Multi-IPE Interface units and only one unit in the daisy-chain is directly connected to the system monitor card in the pedestal. Refer to Appendix, Figure 15 for the connection diagram.

Connecting a single Fiber Remote Multi-IPE Interface to the system monitor

To connect the system monitor cable from the Fiber Remote Multi-IPE Interface unit to the system monitor at the Meridian 1 local site:

- 1 Plug one end of the NT8D46AP cable 6-pin modular plug into the J6 jack of the system monitor in the pedestal. This system monitor can be the master or an upstream system monitor towards the master system monitor.
- 2 Plug the other end of the NT8D46AP cable 6-pin modular plug into the XSM IN (J5) modular jack on the Fiber Remote Multi-IPE Interface unit.

Connecting multiple Fiber Remote Multi-IPE Interface units to the system monitor

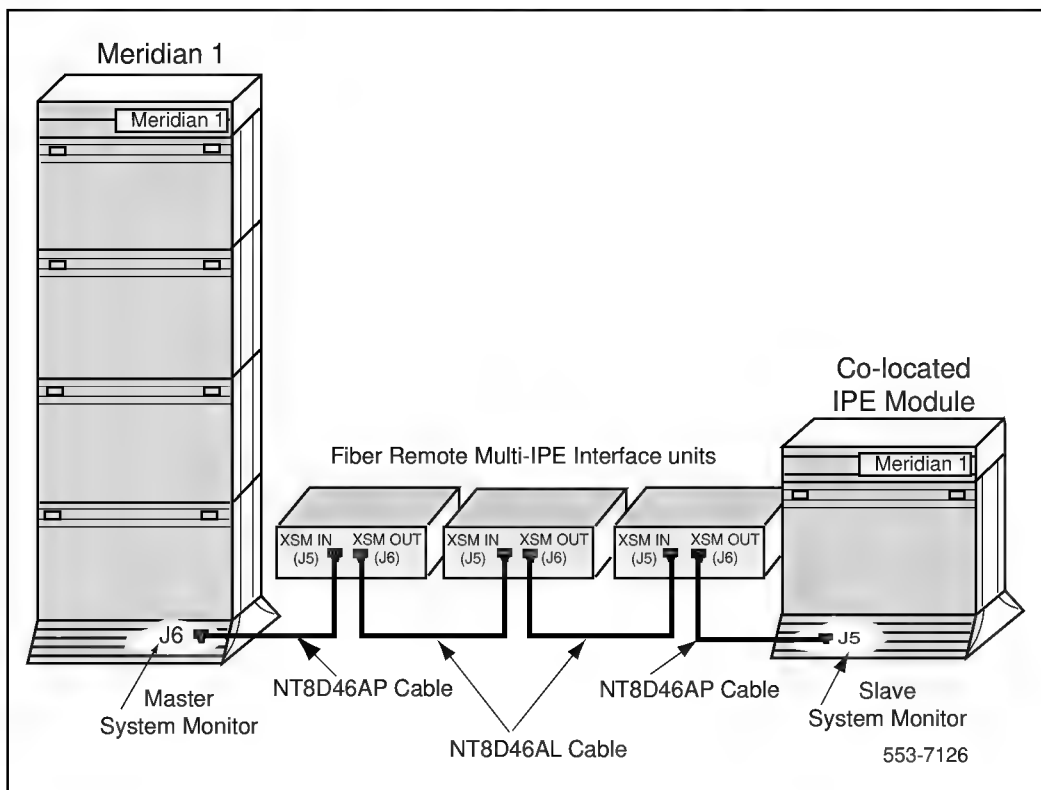
To daisy-chain the system monitor cables to multiple Fiber Remote Multi-IPE Interface units, refer to Figure 10 and perform these steps:

- 1 Plug the one end of the NT8D46AP cable 6-pin modular plug into the 6-pin modular jack J6 on the system monitor card in the Meridian 1 pedestal.
- 2 Plug the other end of the NT8D46AP cable 6-pin modular plug into the first Fiber Remote Multi-IPE Interface unit 6-pin modular jack XSM IN (J5).
- 3 Plug one end of the NT8D46AL (or an equivalent cable) cable 6-pin modular plug into the first Fiber Remote Multi-IPE Interface unit 6-pin modular jack XSM OUT (J6).
- 4 Plug the other end of the NT8D46AL cable 6-pin modular plug into the second Fiber Remote Multi-IPE Interface unit 6-pin modular jack XSM IN (J5).
- 5 Plug one end of the NT8D46AL cable 6-pin modular plug into the second Fiber Remote Multi-IPE Interface unit 6-pin modular jack XSM OUT (J6).
- 6 Plug the other end of the NT8D46AL cable 6-pin modular plug into the third Fiber Remote Multi-IPE Interface unit 6-pin modular jack XSM IN (J5).

- 7 Repeat steps 5 and 6 for any additional Fiber Remote Multi-IPE Interface unit.
- 8 The XSM OUT (J6) in the last Fiber Remote Multi-IPE Interface unit in the daisy-chain connects to the J5 of the slave system monitor in the co-located IPE Module when this system monitor is outbound from the last Fiber Remote Multi-IPE Interface unit in the chain, as shown in Figure 10.

Figure 10 illustrates the daisy-chaining of the system monitor connections for multiple Fiber Remote Multi-IPE Interface units at the local Meridian 1 site.

Figure 10
System monitor daisy-chain connections at the local Meridian 1 site



Connecting the MMI terminal to a single Fiber Remote Multi-IPE Interface unit

Refer to Appendix, Figure 15 for the connection diagram to connect the MMI terminal to the MAINT port and follow these steps:

- 1** To connect the MMI terminal to the Fiber Remote Multi-IPE Interface I/O panel MAINT DB-9 male connector, use the NT7R66BA MMI Cable.
- 2** Plug the NT7R66BA MMI Cable DB-9 female connector into the DB-9 male MAINT connector on the Fiber Remote Multi-IPE Interface unit.
- 3** Plug the DB-25 male connector end of the NT7R66BA MMI Cable into the MMI terminal RS-232 port. If you have to change the gender at the terminal, use the appropriate compact gender changer.

Connecting the MMI terminal using a modem:

- 1** Use the NT7R66AA SDI Cable Kit to connect the DB-9 female MODEM connector on the Fiber Remote Multi-IPE Interface unit to the modem connector.
- 2** Plug the DB-9 male connector of the NT7R66AA SDI Cable Kit into the Fiber Remote Multi-IPE Interface unit DB-9 female MODEM connector.
- 3** Plug the other end of the NT7R66AA SDI Cable Kit into the modem connector. Use the enclosed adapter gender changer, if required.

Connecting the SDI port to a single Fiber Remote Multi-IPE Interface unit

A single Fiber Remote Multi-IPE Interface unit can be connected directly to the SDI port in Meridian 1 over the SDI connector on a single Fiber Remote Multi-IPE Interface unit I/O panel. Refer to Appendix, Figure 15 for the connection diagram.

Connect a single Fiber Remote Multi-IPE Interface unit to the QPC841 or other SDI cards.

Connecting an NT8D41 SDI Paddleboard:

- 1** To connect NT8D41 SDI Paddleboard to the Fiber Remote Multi-IPE Interface SDI DB-9 male connector, use the NT8D93AJ XSDI I/O cable and NT7R66AA SDI Cable Kit, which consists of a 10-foot DB-9 male to DB-25 male cable and a DB-25F/DB-25F adapter.
- 2** Combine the cable and the adapter of the NT7R66AA SDI Cable Kit and tighten the retaining screws.
- 3** Plug the NT8D93AJ cable DB-9 male connector into the Paddleboard DB-9 female connector.
- 4** Plug the NT8D93AJ cable DB-25 male connector into the DB-25 female connector of the NT7R66AA SDI Cable Kit.
- 5** Plug the NT7R66AA SDI Cable Kit DB-9 male connector into the DB-9 female SDI connector on the Fiber Remote Multi-IPE Interface I/O panel.

Connecting any other SDI card:

- 1** To connect other SDI cards to the Fiber Remote Multi-IPE Interface SDI DB-9 male connector, use the NT7R66AA SDI Cable Kit without the DB-25F/DB-25F adapter.
- 2** Plug the DB-25 male connector of the NT7R66AA SDI Cable Kit into the DB-25 female SDI connector on the I/O panel.
- 3** Plug the DB-9 male connector of the NT7R66AA SDI Cable Kit into the DB-9 female connector on the Fiber Remote Multi-IPE Interface unit I/O panel.

Note: For additional information about types of SDI cards, their SDI ports, and special cables required to connect these ports, refer to *Meridian 1 serial data interface cards description* (553-3001-107).

Connecting the SDI card and the MMI terminal to multiple Fiber Remote Multi-IPE Interface units

Make sure that all the Fiber Remote Multi-IPE Interface unit are properly configured for the daisy-chain addressing as shown in Table 9 “Fiber Remote Multi-IPE Interface configuration” on page 48. Refer to Appendix, Figure 16 for the connection diagram.

Note: For maintenance convenience, use the daisy-chain addressing in descending order from the MMI terminal side to the host SDI side.

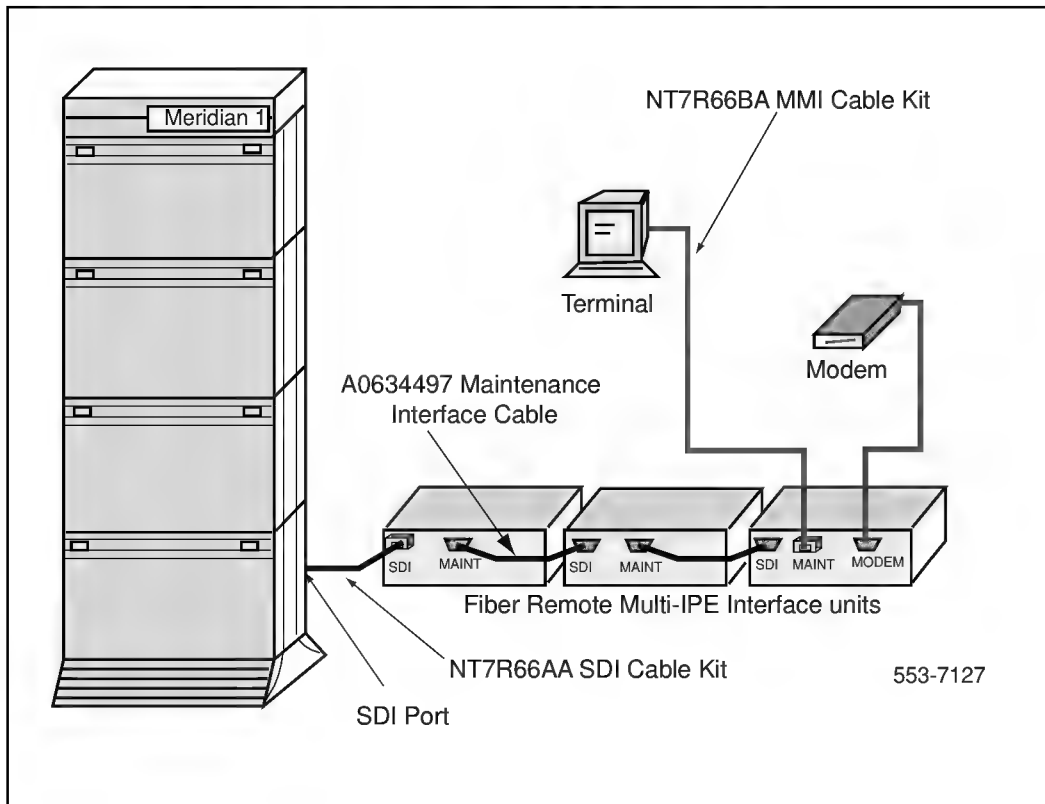
To connect multiple (this example has 3 units) Fiber Remote Multi-IPE Interface unit in a daisy-chain configuration, connect the cables as shown in Figure 11:

- 1** Plug the DB-9 male connector of the NT7R66AA SDI Cable Kit into the SDI port DB-9 female connector on the Fiber Remote Multi-IPE Interface unit #1.
- 2** Connect the Fiber Remote Multi-IPE Interface unit #1 to the SDI card in Meridian 1 as explained in “Connecting the SDI port to a single Fiber Remote Multi-IPE Interface unit” on page 65.
- 3** Plug the A0634497 Maintenance Interface cable into the DB-9 male MAINT connector on the Fiber Remote Multi-IPE Interface unit #1.
- 4** Plug the other end of the A0634497 Maintenance Interface cable into the DB-9 female SDI connector on the Fiber Remote Multi-IPE Interface unit #2.
- 5** Plug a second A0634497 Maintenance Interface cable into the MAINT connector on the Fiber Remote Multi-IPE Interface unit #2.
- 6** Plug the other end of the second A0634497 Maintenance Interface cable into the SDI connector on the Fiber Remote Multi-IPE Interface unit #3.
- 7** Plug the DB-9 female connector of the NT7R66BA MMI Cable into the MAINT port DB-9 male connector on the Fiber Remote Multi-IPE Interface unit #3 (last in the chain).

- 8** Plug the DB-25 male connector of the NT7R66BA MMI Cable into the MMI terminal RS-232 port. If the MMI terminal has other than DB-25 connector, use an appropriate compact adapter.
- 9** If you wish to connect a distant MMI terminal over a modem, connect the NT7R66AA SDI Cable Kit between the DB-9 female MODEM connector on the Fiber Remote Multi-IPE Interface unit #3 and the modem.
- 10** Secure cables with tie-wraps as appropriate.

Figure 11 shows how to connect multiple Fiber Remote Multi-IPE Interface units in a daisy-chain to provide MMI and SDI connections for all Fiber Remote Multi-IPE Interface units and through them to their respective Remote IPE sites.

Figure 11
Daisy-chaining of multiple Fiber Remote Multi-IPE Interface units



Connecting the fiber-optic link

The fiber-optic link connects the local Fiber Remote Multi-IPE Interface with the remote Fiber Remote Multi-IPE Interface. Each Fiber Remote Multi-IPE Interface unit provides a transmit and a receive optical connector for a non-redundant fiber-optic link or two transmit and two receive optical connectors for a redundant fiber-optic link.

The fiber-optic cable fibers, at each end of the link, must be terminated with ST optical connectors. Each connector plugs into the ST optical connector on the Fiber Remote Multi-IPE Interface faceplate. For details of how to engineer and handle the fiber-optic link and the fiber-optic connectors, refer to See “Engineering the fiber-optic link” on page 26.

For a single link, you need to install connectors on only two fibers at each end of the link, one for the transmit side and one for the receive side. For a redundant link, four fibers must have connectors installed at each end.

Note: Label optical fibers in the fiber-optic cable next to the ST optical connectors. Label one fiber XMIT A and its pair RCV A at one end of the link. Label these two fibers at the other end of the link with opposite label, i. e. the XMIT A at one end should be labeled RCV A at the other end of the link and the RCV A at one end should be labeled XMIT A at the other end of the link. Repeat the same procedure for the redundant link with XMIT B and RCV B. For illustration of the link fibers labelling, refer to Figure 6 in the *Product description* section of this document.

To connect the link to the Fiber Remote Multi-IPE Interface at either side of the link, refer to Appendix, Figure 15 for the connection diagram and follow these steps:

- 1 Identify the link ST optical connectors labeled XMIT A and RCV A for a single link, or labeled XMIT A, RCV A, XMIT B, and RCV B for a redundant link.
- 2 Plug the link ST optical connector labeled XMIT A into the Fiber Remote Multi-IPE Interface faceplate ST optical connector labeled XMIT A.
- 3 Plug the link ST optical connector labeled RCV A into the Fiber Remote Multi-IPE Interface faceplate ST optical connector labeled RCV A.
- 4 Repeat steps 2 and 3 for the XMIT B and RCV B if you have a redundant link.
- 5 Route and secure the fiber-optic cable to prevent excessive bending and other physical damage.

Connecting the external alarm cable at the local site

The Fiber Remote Multi-IPE Interface unit provides an external alarm output connector (ALM), which is connected to external alarm indicators at the Meridian 1 local site. These alarm outputs indicate external alarm contact closures at the Remote IPE site and the failure of the fiber-optic link.

Use a cable with a DB-9 male connector at one end and open wires at the other end. The open-wire end can be customized with connector(s) to match your external alarm indicator devices. The length of the cable depends on the distance between the Fiber Remote Multi-IPE Interface unit and the external alarm devices.

Table 11 lists the Fiber Remote Multi-IPE Interface unit DB-9 female ALM connector pinouts for each external output alarm indicator.

Table 11
The DB-9 male ALM connector pinouts (local site)

External Alarm Output Contact Closure	Connector Pin
Output alarm #1 (activated by remote external alarm #1)	7
Output alarm #2 (activated by remote external alarm #2)	2
Output alarm #3 (activated by a fault in the fiber-optic link)	6
Output alarm return	1

To install the external alarm cable:

- 1 Plug the cable DB-9 male connector into the DB-9 female ALM connector on the Fiber Remote Multi-IPE Interface unit. This cable is not supplied.
- 2 Connect the other end of the cable to the external alarm indicator devices. Observe the wires color code as related to the pin assignment at the connector when wiring the external alarm devices to the cable.

Connecting the power source

A Fiber Remote Multi-IPE Interface unit can be powered by a either:

- DC system power source, or
- AC/DC Power Converter

Note: A DC system power source is fused with a 1.3 A fuse at the PDU.

Connecting the DC power source

If the Meridian 1 system is DC-powered or has a DC power backup, you can utilize this -48 V source instead of using the A0634498 AC/DC power converter.

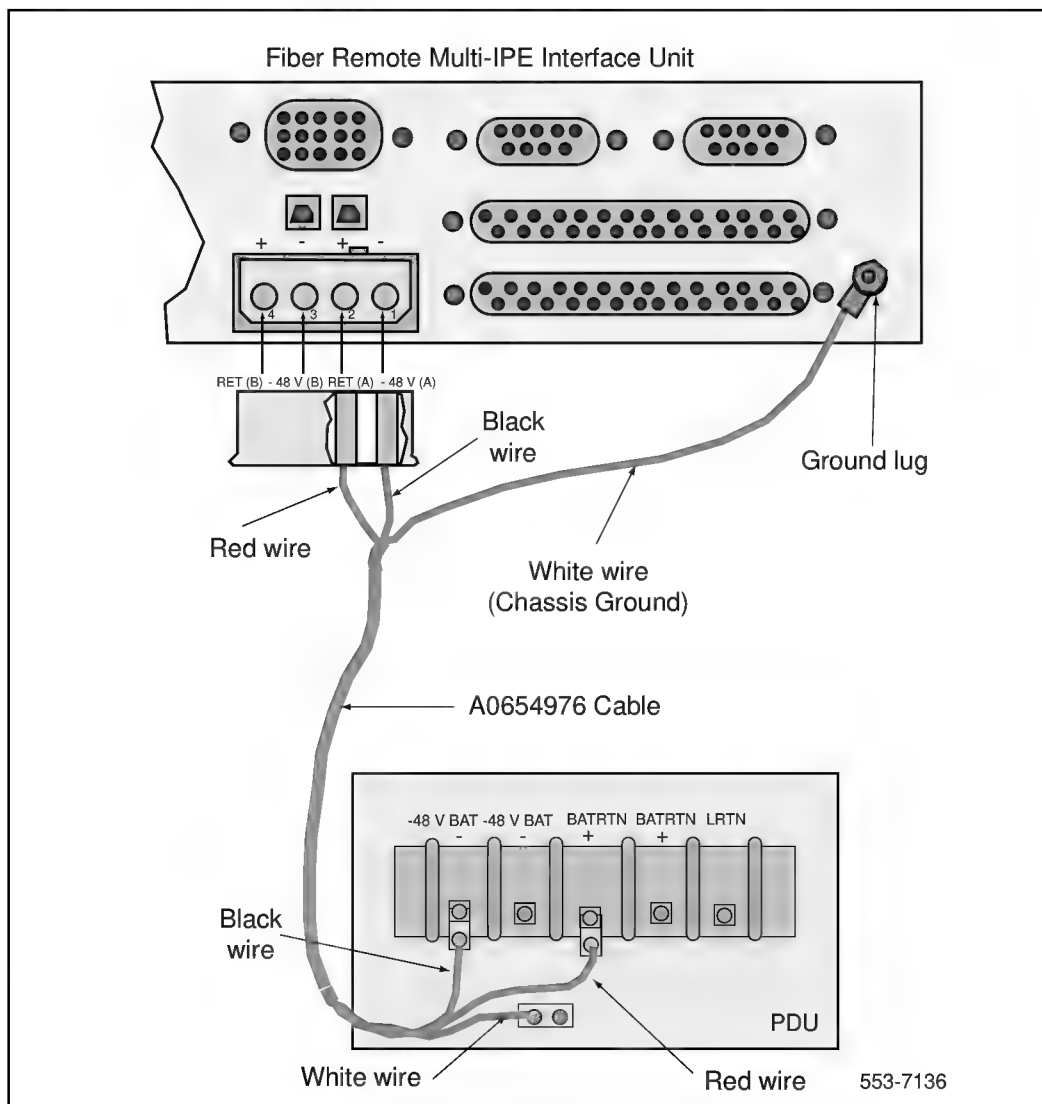
To install the A0654976 DC Power Cable between the system -48 V DC power source and the power connector on the Fiber Remote Multi-IPE Interface unit refer to Figure 12 and the following steps:

- 1** Install lugs onto the open end of the A0654976 DC Power Cable suitable for the power terminals at the DC power source.
- 2** Connect the black wire at the open end of the A0654976 DC Power Cable to the -48V DC terminal on the Meridian 1 DC power system PDU.
- 3** Connect the red wire at the open end of the cable to the Return terminal on the Meridian 1 DC power system PDU.
- 4** Connect the white wire at the open end of the cable to the Ground terminal on the Meridian 1 DC power system Chassis Ground lug.
- 5** Plug the 4-pin connector at the other end of the A0654976 DC Power Cable into the power connector on the Fiber Remote Multi-IPE Interface unit located on the I/O panel at the rear of the unit.
- 6** Connect the white wire at the connector end of the A0654976 DC Power Cable to the Ground lug at the Fiber Remote Multi-IPE Interface unit I/O panel, as shown in Figure 12.
- 7** Observe the POWER LED on the Fiber Remote Multi-IPE Interface unit faceplate. This green LED should turn ON and stay lit as long as the unit is powered.

- 8** Push the ALARM CLEAR button to clear the alarms. The alarms will clear only if both the local and the remote Fiber Remote Multi-IPE Interface units are connected to the fiber-optic link and are communicating.
- 9** If POWER LED does not light, check the connection to the DC power source, the power source, and the Fiber Remote Multi-IPE Interface unit POWER connector. Correct the problem.

Figure 12 shows the power connection of the Fiber Remote Multi-IPE Interface unit to the Meridian 1 DC power source.

Figure 12
DC power connection of the Fiber Remote Multi-IPE Interface unit



Connecting the AC/DC Power Converter

A Fiber Remote Multi-IPE Interface unit is optionally supplied with an A0634498 AC/DC Power Converter to supply power to one Fiber Remote Multi-IPE Interface unit.

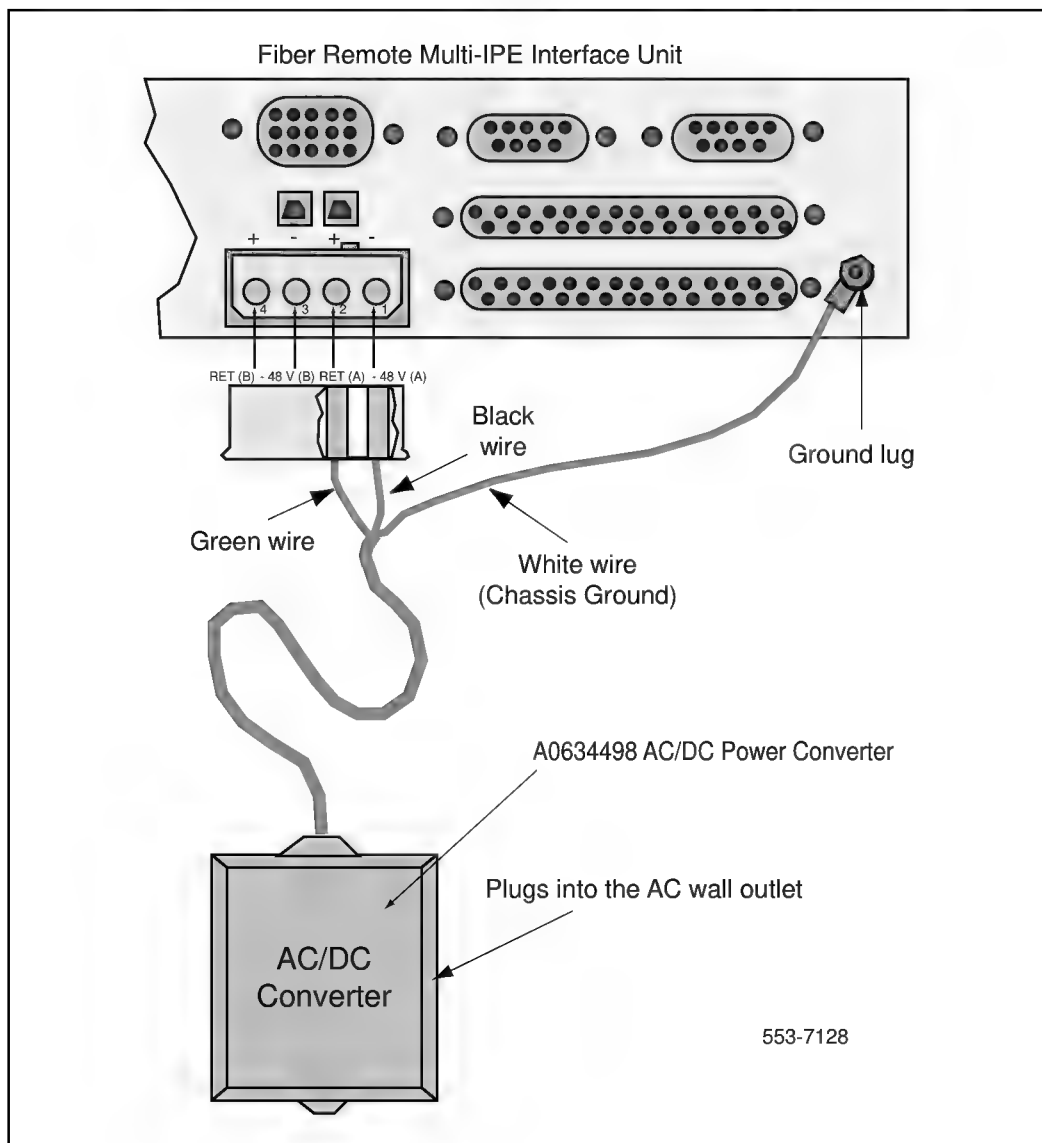
The AC/DC Power Converter plugs directly into a 110 V AC wall outlet. The DC power cord extends from the Power Converter to the -48 V DC power connector on the Fiber Remote Multi-IPE Interface unit I/O panel. Refer to Figure 13 for illustration of this power source connection.

To install the A0634498 AC/DC Power Converter:

- 1** Plug the DC power cord extending from the Power Converter into the -48 V, .6 A POWER connector on the Fiber Remote Multi-IPE Interface unit I/O panel.
- 2** Install the white wire onto the Ground lug at the Fiber Remote Multi-IPE Interface unit I/O panel, as shown in Figure 13.
- 3** Plug the A0634498 AC/DC Power Converter into the AC wall outlet.
- 4** Observe the POWER LED on the Fiber Remote Multi-IPE Interface unit faceplate. This green LED should turn ON and stay lit as long as the unit is powered.
- 5** Push the ALARM CLEAR button to clear the alarms. The alarms will clear only if both the local and the remote Fiber Remote Multi-IPE Interface units are connected to the fiber-optic link and are properly powered.
- 6** If POWER LED does not light, check the Power Converter, the AC outlet, and the Fiber Remote Multi-IPE Interface unit POWER connector. Correct the problem.

Figure 13 illustrates the POWER connector on the I/O panel of the Fiber Remote Multi-IPE Interface unit..

Figure 13
DC system power source connection to the Fiber Remote Multi-IPE Interface unit



Remote IPE installation

The Remote IPE column is normally assembled in the factory with cards already installed.

If the Remote IPE column is not assembled in the factory, follow the instructions in *Meridian 1 system installation procedures* (553-3001-210). It describes how to install the pedestal, the IPE Module, the top cap, the cards, and how to connect the power, the internal and external communication cables, and subscriber loops.

To install the PFTU to the Remote IPE, also follow the instructions in *Meridian 1 system installation procedures* (553-3001-210).

Installing the internal cables to the Remote IPE module

In a standard IPE module installed in a Meridian 1 column, the connection between the IPE module backplane connectors SL0-SL3 and the Superloop Network card J1 and J2 faceplate connectors are made directly without routing the cables to their respective I/O panels.

In the Remote IPE column, the SL0-SL3 connectors are connected to the I/O panel using the NT8D92AB Controller to I/O panel cables. The number of cables required is equal to the number of superloops required to support the traffic conditions in the Remote IPE. A Remote IPE shipped from the factory will probably have these cables already installed. However, you can modify any standard IPE Module into the Remote IPE by installing these NT8D92AB Controller to I/O panel cables into an IPE module.

To install these cables, refer to Appendix, Figure 17 for the connection diagram and follow these steps:

- 1** Remove the back cover at the rear of the Remote IPE module to expose the backplane and the I/O panel connector cutouts.
- 2** Plug the NT8D92AB cable 24-pin block connector into the 24-pin block connector SL0 on the Remote IPE module backplane.
- 3** Install the NT8D92AB cable 24-pin Centronics connector onto the I/O panel of the Remote IPE module. Find a connector cutout to fit the cable connector mounting screw holes.

- 4 Repeat steps 2 and 3 for each NT8D92AB cable connecting SL1, SL2, and SL3 backplane connectors, if these are required.
- 5 Replace the back cover on the Remote IPE module.

Setting S1 and S2 switches at the remote site

Before you can install a Fiber Remote Multi-IPE Interface unit, you must:

- Configure the Fiber Remote Multi-IPE Interface using S1 and S2 dip-switches
- Install redundant fiber-optic connectors, if required

Table 12 lists switches S1 and S2 and their settings based on the Fiber Remote Multi-IPE Interface position in the system.

Table 12
Switch S1 and S2 settings

Function Selection	Switch and Position	Switch Setting
For single Fiber Remote Multi-IPE Interface unit	S1 Position 1 and Position 2	ON (at local and remote sites)
Fiber Remote Multi-IPE Interface at the MMI terminal or modem end of the daisy-chain	S1 Position 1 Position 2	ON OFF
Fiber Remote Multi-IPE Interface in the middle of the daisy-chain	S1 Position 1 Position 2	OFF OFF
Fiber Remote Multi-IPE Interface system monitor address	S1 Positions 3-8	Refer to Table 10
Physical location of the Fiber Remote Multi-IPE Interface	S2 Position 1	ON-Remote site
Reserved for future use	S2 Positions 3-8	OFF
Note: Switch position: ON= Down and OFF= Up for S1 and S2 switches.		

Table 13 shows S1 switch position 3-5 that represent the system monitor address numbers from 0 to 63 at the remote site.

Table 13
System monitor address selection (Part 1 of 3)

Address	S1 Pos 3	S1 Pos 4	S1 Pos 5	S1 Pos 6	S1 Pos 7	S1 Pos 8
00	OFF	OFF	OFF	OFF	OFF	OFF
01	ON	OFF	OFF	OFF	OFF	OFF
02	OFF	ON	OFF	OFF	OFF	OFF
03	ON	ON	OFF	OFF	OFF	OFF
04	OFF	OFF	ON	OFF	OFF	OFF
05	ON	OFF	ON	OFF	OFF	OFF
06	OFF	ON	ON	OFF	OFF	OFF
07	ON	ON	ON	OFF	OFF	OFF
08	OFF	OFF	OFF	ON	OFF	OFF
09	ON	OFF	OFF	ON	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF
12	OFF	OFF	ON	ON	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF
16	OFF	OFF	OFF	OFF	ON	OFF
17	ON	OFF	OFF	OFF	ON	OFF
18	OFF	ON	OFF	OFF	ON	OFF
19	ON	ON	OFF	OFF	ON	OFF
20	OFF	OFF	ON	OFF	ON	OFF
21	ON	OFF	ON	OFF	ON	OFF
22	OFF	ON	ON	OFF	ON	OFF
23	ON	ON	ON	OFF	ON	OFF
24	OFF	OFF	OFF	ON	ON	OFF

Table 13
System monitor address selection (Part 2 of 3)

Address	S1 Pos 3	S1 Pos 4	S1 Pos 5	S1 Pos 6	S1 Pos 7	S1 Pos 8
25	ON	OFF	OFF	ON	ON	OFF
26	OFF	ON	OFF	ON	ON	OFF
27	ON	ON	OFF	ON	ON	OFF
28	OFF	OFF	ON	ON	ON	OFF
29	ON	OFF	ON	ON	ON	OFF
30	OFF	ON	ON	ON	ON	OFF
31	ON	ON	ON	ON	ON	OFF
32	OFF	OFF	OFF	OFF	OFF	ON
33	ON	OFF	OFF	OFF	OFF	ON
34	OFF	ON	OFF	OFF	OFF	ON
35	ON	ON	OFF	OFF	OFF	ON
36	OFF	OFF	ON	OFF	OFF	ON
37	ON	OFF	ON	OFF	OFF	ON
38	OFF	ON	ON	OFF	OFF	ON
39	ON	ON	ON	OFF	OFF	ON
40	OFF	OFF	OFF	ON	OFF	ON
41	ON	OFF	OFF	ON	OFF	ON
42	OFF	ON	OFF	ON	OFF	ON
43	ON	ON	OFF	ON	OFF	ON
44	OFF	OFF	ON	ON	OFF	ON
45	ON	OFF	ON	ON	OFF	ON
46	OFF	ON	ON	ON	OFF	ON
47	ON	ON	ON	ON	OFF	ON
48	OFF	OFF	OFF	OFF	ON	ON
49	ON	OFF	OFF	OFF	ON	ON
50	OFF	ON	OFF	OFF	ON	ON
51	ON	ON	OFF	OFF	ON	ON
52	OFF	OFF	ON	OFF	ON	ON

Table 13
System monitor address selection (Part 3 of 3)

Address	S1 Pos 3	S1 Pos 4	S1 Pos 5	S1 Pos 6	S1 Pos 7	S1 Pos 8
53	ON	OFF	ON	OFF	ON	ON
54	OFF	ON	ON	OFF	ON	ON
55	ON	ON	ON	OFF	ON	ON
56	OFF	OFF	OFF	ON	ON	ON
57	ON	OFF	OFF	ON	ON	ON
58	OFF	ON	OFF	ON	ON	ON
59	ON	ON	OFF	ON	ON	ON
60	OFF	OFF	ON	ON	ON	ON
61	ON	OFF	ON	ON	ON	ON
62	OFF	ON	ON	ON	ON	ON
63	ON	ON	ON	ON	ON	ON

Installing the Fiber Remote Multi-IPE Interface unit

The Fiber Remote Multi-IPE Interface unit can be installed onto a wall or into a rack-mounted shelf that accommodates up to six Fiber Remote Multi-IPE Interface units. These units must be install within 30 feet from the Remote IPE and no further than 25 feet from the power source, because the cables connecting the Fiber Remote Multi-IPE Interface units to the Meridian 1 equipment are 30 feet long and the power cable is 25 feet long.

In some instances, a remote site may have multiple Fiber Remote Multi-IPE Interface units, which may be installed into the rack-mounted shelf. To perform this installation, refer to “Installing multiple Fiber Remote Multi-IPE Interface units into the shelf” on page 56

Installing the unit onto the wall

Two slotted holes are provided at the back of the Fiber Remote Multi-IPE Interface unit enclosure to mount the Fiber Remote Multi-IPE Interface unit on the wall such that the faceplate is located on the left-hand-side and the I/O panel at the right-hand-side of the unit.

To mount the Fiber Remote Multi-IPE Interface unit on the wall, refer to Figure 9 “Wall-mounting the Fiber Remote Multi-IPE Interface unit” on page 60 and follow these steps:

- 1** Find a location on the wall to give the Fiber Remote Multi-IPE Interface unit enough clearance to install the fiber-optic cables in the front and superloop cables in the back of the unit. Allow for a minimum of six inches of clearance in the front for the fiber-optic cables. Provide a minimum of 13 inches of clearance in the front.
- 2** Position the wall mount template on the wall and use a level to ensure horizontal positioning of the Fiber Remote Multi-IPE Interface unit.
- 3** Mark the three screw holes and the two alignment marks. Drill the screw holes.
- 4** Screw two number 8 screws into the wall board or plywood. The screw heads should be 1/16 inch away from the wall surface to allow you to insert the screw heads into the slotted holes on the bottom of the Fiber Remote Multi-IPE Interface unit as shown in Figure 9.

- 5 Place the wall mount bracket in the upper rear corner of the Fiber Remote Multi-IPE Interface unit and fasten it to the Ground lug with the attached nut and lock washer.
- 6 Position the Fiber Remote Multi-IPE Interface unit's holes over the two screws on the wall, insert the screws into the holes, and push the Fiber Remote Multi-IPE Interface unit to the left to engage the screws into the narrow of the slots.
- 7 Fasten the top of the wall mount bracket to the wall with the provided screw.

Installing superloop cables

The number of A0634496 Remote Superloop cables required to connect the Remote IPE I/O panel 24-pin Centurions connectors to the 37-pin D Shell SUPERLOOP connectors on the Fiber Remote Multi-IPE Interface I/O panel depends on the number of superloops required to support the Remote IPE site configuration.

Note: Use the superloop connection plan that you completed based on the traffic blocking criteria for Remote IPE segments and Table 1 “Superloop connection configurations” on page 7.

To install these cables and use longer screws to install them into the I/O panel cutouts:

- 1 Locate all the superloop connectors on the Remote IPE I/O panel designated to support Remote IPE sites over fiber-optic links.
- 2 Verify that you have configured and installed the appropriate version of the Fiber Remote Multi-IPE Interface unit (number of superloops and type of fiber supported). Refer to Table 2 “Equipment required to link Meridian 1 to Remote IPE sites” on page 8.
- 3 Plug the 24-pin Centronics A0634496 Remote Superloop cable connector into the designated 24-pin I/O panel connector on the Remote IPE module. Refer to Appendix, Figure 17 for the connection diagram.
- 4 Plug the 37-pin D Shell connector into the appropriate SUPERLOOP connector on the Fiber Remote Multi-IPE Interface unit I/O panel.
- 5 Repeat steps 3 and 4 for each superloop you have to connect.

Connecting the system monitor cable

The Fiber Remote Multi-IPE Interface unit is directly connected to a system monitor in the pedestal. Refer to Appendix, Figure 17 for the connection diagram.

To connect the system monitor cable from the Fiber Remote Multi-IPE Interface unit at the remote site:

- 1** Plug one end of the NT8D46AP cable 6-pin modular plug into the J5 jack on the system monitor in the pedestal.
- 2** Plug the other end of the NT8D46AP cable 6-pin modular plug into the XSM IN (J5) modular jack on the Fiber Remote Multi-IPE Interface unit.

Note: At the remote site the connection is made from the J5 of the system monitor to the XSM IN (J5) on the Fiber Remote Multi-IPE Interface unit.

- 3** Determine the system monitor address for each remote site by setting S1 positions 3-8 on the Fiber Remote Multi-IPE Interface unit. Before you select the address, you must determine which are the available system monitor addresses using the system TTY, as follows:
 - Execute the **STAT XSM** command in **LD 37** to poll all system monitors. Correct any problems.
 - Determine available system monitor addresses to be assigned to the Remote IPE module.
 - Set master system monitor slave polling address range to cover the new Remote IPE system monitor address.
 - Set Fiber Remote Multi-IPE Interface unit **S1** positions **3-8** for the new system monitor address at the remote site, refer to Table 13 for address selection.
 - Re-connect the system monitor daisy-chain to include new Fiber Remote Multi-IPE Interface units, if any.
 - Test the system monitor daisy-chain by executing the **STAT XSM** command in **LD 37** to ensure that every local and remote system monitor is responding to the master system monitor.

Note: In Fiber Remote Multi-IPE Interface units are daisy-chained at the remote site, the system monitor address becomes also the daisy-chain address.

Connecting the MMI terminal

An MMI terminal can be directly connected to the Fiber Remote Multi-IPE Interface unit at the remote site. Refer to Appendix, Figure 17 for the connection diagram.

Multiple Fiber Remote Multi-IPE Interface units at the remote site can be daisy-chained to allow sharing of the MMI terminal among all the Fiber Remote Multi-IPE Interface units in the chain.

Connecting the MMI terminal to a single Fiber Remote Multi-IPE Interface unit

An MMI terminal can be directly connected to the remote site Fiber Remote Multi-IPE Interface unit to provide a maintenance and testing facility for the Remote IPE and across the fiber-optic link for the Meridian 1 and the Fiber Remote Multi-IPE Interface units connected to Meridian 1. One of the main functions of the MMI terminal at the remote site is to access the system remotely using the Host SDI mode.

To connect the MMI terminal:

- 1** To connect the MMI terminal to the Fiber Remote Multi-IPE Interface I/O panel MAINT DB-9 male connector, use the NT7R66BA MMI Cable.
- 2** Plug the DB-9 female connector of the NT7R66BA MMI Cable into the DB-9 male MAINT connector on the Fiber Remote Multi-IPE Interface unit.
- 3** Plug the DB-25 male connector of the NT7R66BA MMI Cable into the DB-25 female connector on the MMI terminal. If the MMI terminal has other than DB-25 connector or a different gender, use an appropriate adapter.

Connecting the MMI terminal using a modem:

- 1** Use the NT7R66AA SDI Cable Kit to connect the DB-9 female MODEM connector on the Fiber Remote Multi-IPE Interface unit to the modem connector.
- 2** Plug the DB-9 male connector of the NT7R66AA SDI Cable Kit into the Fiber Remote Multi-IPE Interface DB-9 female MODEM connector.
- 3** Plug the other end of the cable into the modem connector.

Connecting the MMI terminal to multiple Fiber Remote Multi-IPE Interface units

Make sure that all the Fiber Remote Multi-IPE Interface units are properly configured for the daisy-chain addressing as shown in Table 9 “Fiber Remote Multi-IPE Interface configuration” on page 48.

To connect multiple (in this example we have 3 units) Fiber Remote Multi-IPE Interface unit in a daisy-chain configuration, refer to Figure 11 “Daisy-chaining of multiple Fiber Remote Multi-IPE Interface units” on page 68, except ignore the SDI connection. Follow the steps below:

- 1** Plug the DB-9 female connector on the A0634497 Maintenance Interface cable into the DB-9 male MAINT connector on the Fiber Remote Multi-IPE Interface unit #1.
- 2** Plug the other end of the A0634497 Maintenance Interface cable into the SDI connector on the Fiber Remote Multi-IPE Interface unit #2.
- 3** Plug a second A0634497 Maintenance Interface cable into the MAINT connector on the Fiber Remote Multi-IPE Interface unit #2.
- 4** Plug the other end of the second A0634497 Maintenance Interface cable into the SDI connector on the Fiber Remote Multi-IPE Interface unit #3.
- 5** Plug the NT7R66BA MMI Cable DB-9 female connector into the DB-9 male MAINT connector of the Fiber Remote Multi-IPE Interface unit #3.
- 6** Plug the DB-25 male connector on the NT7R66BA MMI Cable into the RS-232 MMI terminal port. If the MMI terminal has other than DB-25 connector, use an appropriate adapter or gender changer.

- 7 If you wish to connect a distant MMI terminal over a modem, install the NT7R66AA SDI Cable Kit between the MODEM connector on the Fiber Remote Multi-IPE Interface unit #3 and the modem.
- 8 Secure cables with tie-wraps as appropriate.

Connecting the fiber-optic link to the Remote IPE Module

The fiber-optic link connects the local Fiber Remote Multi-IPE Interface with the remote Fiber Remote Multi-IPE Interface.

The fiber-optic cable fibers, at each end of the link, must be terminated with an ST optical connector. This connector plugs into the ST optical connector on the Fiber Remote Multi-IPE Interface faceplate at the Remote IPE site.

For a single link, you need to install connectors on only two fibers at each end of the link, one for the transmit side and one for the receive side. For a redundant link, four fibers must have connectors installed at each end. For details of how to engineer and handle the fiber-optic link and the fiber-optic connectors, refer to See “Engineering the fiber-optic link” on page 26. Also, refer to Appendix, Figure 17 for the connection diagram.

Note: Label optical fibers in the fiber-optic cable next to the ST optical connectors. Fibers labeled XMIT A and its pair RCV A at the local end of the link must be labeled RCV A and its pair XMIT A at remote end. Repeat the same procedure for the redundant link with XMIT B and RCV B. At the cross-connect typical designation is; Post A for receive fiber and Pos B for the transmit fiber. For illustration of the link fibers labelling, refer to Figure 6 in the *Product description* section of this document.

To connect the fiber-optic link to the Fiber Remote Multi-IPE Interface at the Remote IPE site:

- 1 Identify the link ST optical connectors labeled XMIT A and RCV A for a single link, or labeled XMIT A, RCV A, XMIT B, and RCV B for a redundant link.
- 2 Plug the link ST optical connector labeled XMIT A into the Fiber Remote Multi-IPE Interface faceplate ST optical connector labeled XMIT A.

- 3 Plug the link ST optical connector labeled RCV A into the Fiber Remote Multi-IPE Interface faceplate ST optical connector labeled RCV A.
- 4 Repeat steps 2 and 3 for the XMIT B and RCV B if you have a redundant link.
- 5 Route and secure the fiber-optic cable to prevent excessive bending and other physical damage.

Connecting the external alarm cable at the remote site

The Fiber Remote Multi-IPE Interface unit provides an external alarm input/output connector (ALM), which is connected to two external alarm inputs and one external alarm output at the Remote IPE site. Alarm inputs indicate external alarm contact closures at the Remote IPE site and the external alarm output indicates failure of the fiber-optic link.

Use a cable with a DB-9 male connector at one end and open wire at the other end. The other end can be customized with connector(s) to match your two external alarm input devices and one external alarm output device. The length of the cable depends on the distance between the Fiber Remote Multi-IPE Interface unit and the external alarm devices.

Table 14 lists the Fiber Remote Multi-IPE Interface unit ALM connector pin assignment at the Remote IPE site. This connector connects external alarms to the Fiber Remote Multi-IPE Interface unit. These alarms are reported over the fiber-optic link to the local Meridian 1 site.

Table 14
Remote IPE site DB-9 male ALM connector pinouts (remote site)

External Alarm Connection	Connector Pin
External alarm input #1 (activated by external contact closure)	9
External alarm input #2 (activated by external contact closure)	4
External alarm input return	5
External alarm output (activated by fiber-optic link failure)	6
External alarm output return	1

To install the external alarm cable:

- 1** Plug the cable DB-9 male connector into the DB-9 female ALM connector on the Fiber Remote Multi-IPE Interface unit.
- 2** Connect the other end of the cable open wires to two external alarm input devices and one external alarm output device. Observe the wire color codes and their corresponding pin assignments at the DB-9 connector to correctly connect alarm devices to the Fiber Remote Multi-IPE Interface unit.

Connecting the power source at the remote site

To install the DC power source to the Fiber Remote Multi-IPE Interface unit at the remote site, refer to “Connecting the DC power source” on page 71. To install and connect the Power Converter to the Fiber Remote Multi-IPE Interface unit at the remote site, refer to “Connecting the AC/DC Power Converter” on page 74.

Configuring the equipment

The configuration and administration of Remote IPE at one or more remote sites and the Meridian 1 at the local site are identical to the standard Meridian 1 configuration and administration and do not require special considerations.

However, there are some Fiber Remote Multi-IPE Interface initial setup functions that must be considered at either local or the remote site. These functions are administered over a man machine interface (MMI) port connected to a terminal at the local and the remote sites.

When configuring Remote IPE functions at the local and the remote sites you can configure the Superloop Network cards and the Peripheral Controller cards dedicated to the Remote IPE exactly the same way you configure any other standard Superloop Network cards and Peripheral Controller cards by using:

- Configuration Record programs LD 17 and LD 97
- MMI commands to configure the Fiber Remote Multi-IPE Interface parameters

Factory default parameter settings

The Fiber Remote Multi-IPE Interface units are set in the factory as listed in Table 15:

Table 15
Factory default parameter settings

Parameter	Default setting
Time	Central Standard Time
Date	Current
Name	Fiber
Alarm Enable/Disable	Enable
Alarm Self-Clearing Enable/Disable	Enable
Bit Error Alarm Threshold	10 ⁻¹⁰

Configuring the cards

When the Remote IPE equipment is first installed, you must define the NT8D04 Superloop Network and NT8D01 Peripheral Controller cards dedicated to Remote IPE support.

To do this you must:

- print the current system configuration record to identify possible available superloops
- remove an existing superloop data block if it already exists for a superloop that is not dedicated to the Remote IPE

Note: To remove superloop data blocks, remove all terminal numbers (TNs) associated with the peripheral controller, disable the superloop, and remove the data block associated with the peripheral controller. You can also move data blocks of one superloop to a different superloop number using Move Data Blocks Program LD 25.

- configure a superloop data block to correspond to the Superloop Network card dedicated to the Remote IPE
- configure a peripheral controller data block to correspond to the Peripheral Controller card in the Remote IPE

Before you can define a superloop for Remote IPE, you must find available superloops in the system. To do this, logon and print system configuration data using Print Program LD 22.

Request CFN printout

Prompt	Response	Comment
REQ	PRT	Print request
TYPE	CEQU PKG, PSWV	Configuration data

From the report you can find unused superloops, which you can use for the Fiber Remote Multi-IPE Interface application.

CFN configuration data print format- find unused superloop

CEQU		
MPED	SD/DD/4D/8D	Prints maximum peripheral density for the system (use 8D for systems with IPE)
TERM	xxx xxx xxx...	Prints all terminal loops
REMO	xxx xxx xxx...	Prints remote EPE loop numbers configured in LD 17
SUPL	xxx xxx xxx...	Lists all local Superloop Network card superloop numbers

To change the system configuration record and to configure the Peripheral Controller card at the Remote IPE site, load Configuration Record Program LD 17 and Configuration Record Program LD 97.

To change the system configuration record (LD 17)

Prompt	Response	Comment
REQ	CHG	Change the configuration record
TYPE	CFN	Configuration record
CEQU	YES	Change equipment
MPED	8D	Peripheral density

To configure the Remote IPE site (LD 97)

REQ	CHG	Change definition
TYPE	XPE	Remote Peripheral Controller ID
XPEC	2	Card position
LOC	SCLARA	Remote site location example. Use any 6 alphanumeric characters to identify the remote site
MED		
RGTP	(8)/16	Default umber of concurrent ringers. Change to a maximum of16 ringers capacity for all ringers except the old DC version

After you have defined the new Peripheral Controller, define the superloop for the Superloop Network card designated to support the Remote IPE.

To define a carrier superloop

Prompt	Response	Comment
REQ	CHG	Adding a new Superloop Network card
TYPE	SUPL	Adding a superloop for the Superloop Network card.
SUPL	0–156	Superloop number
SLOT	(L)/R	Superloop card side for the Superloop Network card, where L (left) is default position.
XPEC	1–95	Peripheral Controller card previously equipped.

To configure new Host SDI maintenance and service change, load Configuration Record Program LD 17 and Configuration Record Program LD 97.

Configuring the SDI port for the Superloop Network card connection (LD 17)

REQ	CHG	Change the SDI record
TYPE	CFN	Configuration record
IOTB	YES	
HIST		I/O terminal history file buffer length
ADAN	NEW/TTY 0–15	Add, change, or remove an I/O device, type aaa, or port x
USER	BUG, MTC, SCH	Enter one of the output message types that will be the message of this port
XSM	(NO)	SDI port for the system monitor

To enable the superloop, load Maintenance and Diagnostic Program LD 32 and execute the **ENLL sl** command.

To enable the superloop sl

Command	Response	Comment
ENLL sl	ok & prompt	Enables specified superloop sl

To remove the configuration of the Remote IPE superloop, load Maintenance and Diagnostic Program LD 32 and execute the **DISL sl** command to disable the superloop, and then load Configuration Record Program LD 97 to delete the configuration records of the superloop for the Superloop Network card and the Peripheral Controller card.

To delete the configuration record for the superloop

Prompt	Response	Comment
REQ	CHG	Deleting the Superloop Network card configuration record
TYPE	SUPL	Superloop
SUPL	X8	Remove record for superloop number 8

To delete the configuration record for the Remote IPE module

REQ	CHG	Change configuration record
TYPE	XPE	Remote IPE
XPEC	X2	Delete configuration record for the Peripheral Controller 2

To check the status of the specified superloop, load the LD 32 and execute the **STAT sl**, where **sl** is the superloop number.

Configuring the Fiber Remote Multi-IPE Interface unit

The configuration and administration of the Fiber Remote Multi-IPE Interface at the local or the remote site consists of the following:

- Selecting the MMI terminal modes
- Setting modem parameters
- Configuring fiber-optic link performance criteria
- Performing maintenance functions
- Conducting test and diagnostic functions

Selecting the MMI terminal modes

The MMI terminal can be set in the Host SDI or the MMI mode. When the MMI terminal is in the SDI mode, you can perform system administration tasks from the local or the remote site. When the MMI terminal is in the MMI mode you can:

- perform Fiber Remote Multi-IPE Interface functions such as display status, logs, performance information, history, and messages
- enable or disable alarms
- clear errors and logs
- set performance parameters
- specify tests

Selecting the MMI mode

In the MMI mode, a terminal is connected to the MMI port at the local Fiber Remote Multi-IPE Interface unit and another terminal is connected to the MMI port at the Fiber Remote Multi-IPE Interface unit at the remote site. Each terminal can control MMI functions at the local and across the fiber-optic link at the distant site. In a daisy-chain configuration an MMI terminal can access any Fiber Remote Multi-IPE Interface unit in the chain at the local or remote site.

The default MMI interface characteristics are set in the Fiber Remote Multi-IPE Interface unit as follows:

- Speed: 2400 bps

- Character width: 7 bits
- Parity bit: mark
- Stop bit: 1

Note: This is a single user system, i.e. only one terminal can be active on the system at the time.

Logging in. The MMI mode is accessed from the initial (INIT) mode by entering **L** or **LOGIN** on the terminal to log in. For multiple Fiber Remote Multi-IPE Interface units connected in a daisy-chain, to log in to the specified Fiber Remote Multi-IPE Interface, enter **L <xx>**, where **xx** is the address of a specific Fiber Remote Multi-IPE Interface unit in the chain. Refer to Table 10 “Fiber Remote Multi-IPE Interface and system monitor address selection table” on page 49.

Entering password. After you logged in, you will be prompted to enter the password. The password is **FIBER** and it must be entered in all capital letters.

Exiting the MMI mode. To exit the MMI mode and return to the INIT mode, enter **Q** at the MMI terminal.

Selecting Host SDI mode

In the Host SDI mode, a terminal is connected to the MAINT port or to the MODEM port (through a modem) at the Fiber Remote Multi-IPE Interface unit. This terminal becomes the Meridian 1 maintenance and service change TTY. At the Meridian 1 site, a single Fiber Remote Multi-IPE Interface unit connects a terminal to its MAINT port and an SDI card to its SDI port. In a daisy-chain configuration, the MMI terminal is connected to the MAINT port of the first unit in the chain and the SDI card is connected to the last unit in the chain.

Note: When a terminal is in the Host SDI mode and is active over the fiber-optic link, other MMI terminals can not execute the MMI (DISTANT) commands, for example; D S D command, until the Host SDI mode stops communication over the link or the mode is changed into the MMI mode.

For the MAINT port, at the Remote IPE site, to be able to communicate over the SDI port at the local site, the interface characteristics must be the same at both sites:

- Speed: 2400 bps
- Character width: 7 bits
- Parity bit: mark
- Stop bit: 1

In this mode, the remote MMI terminal becomes a Meridian 1 system TTY that can access overlays and perform system configuration, maintenance, and diagnostics, which are the same functions performed by the local Meridian 1 system TTY.

To log into the host for SDI operation, you should first log in using the MMI terminal in the MMI mode, then you should log into the terminal as host:

FI:: >L	Login command
Enter Password > FIBER	Type in the password in capital letters.
FI::> HO	To access the Host SDI mode
Enter Password > HOST	Enter the password HOST
Host Busy. Barge In (Y or N) Y	May want to barge in but the connection may be denied if an other terminal is active in the Host SDI mode.

The Host SDI mode is accessed from the MMI mode by entering **HOST** at the terminal or TTY. In this mode you can configure and maintain the entire Meridian 1 system. Figure 14 shows that, for example, LD 32 can be activated to perform loopback testing.

To exit this mode, enter @@@.

Configuring the MMI modem

To connect a distant MMI terminal to a Fiber Remote Multi-IPE Interface unit at either the local or the remote site, the Fiber Remote Multi-IPE Interface provides the MODEM DB-9 female connector with a DTE interface. This connector connects a Hayes-compatible auto-answering modem to the Fiber Remote Multi-IPE Interface unit allowing an MMI terminal to perform local maintenance and through the fiber-optic link to perform the far-end maintenance. For proper operation, the modem must be configured as follows:

- Speed -2400 baud
- Auto-answer - ON
- Carrier loss delay - 5/10 second or less
- Local echo - OFF
- Result codes - disabled
- Character width - 7 bits
- Parity bit - mark
- Stop bit - one

Table 16 lists the pin assignment of the MODEM DB-9 female connector that connects the Fiber Remote Multi-IPE Interface unit to the modem.

Table 16
Fiber Remote Multi-IPE Interface MODEM connector pin assignment

Pin number	Function
2	Receive data from modem
3	Transmit data to modem
5	Signal ground

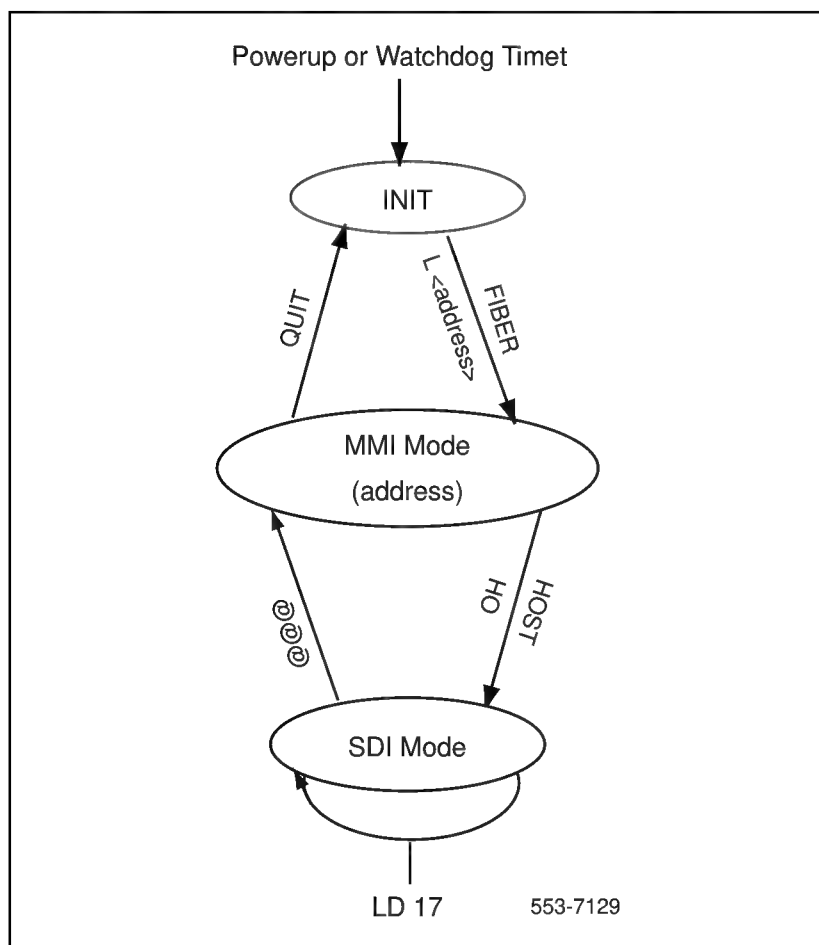
Use a terminal or set the computer into the terminal mode and connect it to the modem to be able to configure the modem.

To configure the modem parameters using a character string or a dip-switch, where applicable:

- 1 Set baud rate by sending the AT<cr> command to the modem at the desired baud rate. This sets the modem baud rate. If the modem is already set with no echo or result codes, the modem will not reply back to the terminal the result of the command action.
- 2 Set auto-answer to ON. If the modem has a dip-switch, set switch position #5 to the UP position, otherwise type AT\$0=1&W0&Y0<cr>.
- 3 Set carrier loss delay to 5/10 second or less. Type AT\$10=5<cr>. This sets the hang-up time of 1/2 second upon loss of carrier.
- 4 Disable local echo. If the modem has a dip-switch, set switch position #4 to the DOWN position. Otherwise, type ATE0&W0&Y0<cr>.
- 5 Disable result codes. If the modem has a dip-switch, set switch position #3 to the UP position. Otherwise, type ATQ1&W0&Y0<cr>.

Figure 14 shows modes that a terminal can be in and paths taken to transition from one mode to the next. The three modes are Initial, MMI, and SDI. The words in quotation marks shown along the paths must be entered on the terminal to go from one mode to the next.

Figure 14
TTY or terminal modes at the local and the remote sites



Configuring the Fiber Remote Multi-IPE Interface

To configure the Fiber Remote Multi-IPE Interface using the MMI terminal, you must logon, enter the password, and use appropriate MMI commands.

Note: The commands are not case sensitive (you can use upper or lower case letters). The exception is the password, which must always be entered in upper case.

Before you start configuring the Fiber Remote Multi-IPE Interface, you must make sure that the communication is established with the distant end otherwise, the MMI commands will not have effect at the far-end. Commands affecting the far-end can be executed only when the distant end is communicating and the Microlink is up.

To verify that the communication is established, display the status at each end of the fiber-optic link by executing the **DS** and **DS D** commands on the MMI terminal to display the superloop and the fiber-optic link status at the near-end and the far-end of the link. If the Alarm Level is 0 for at least one link at both ends the communication is established.

To display near-end (local) link status:

FII:: > DS

Fiber Remote IPE S/N 2502-R3 Software Version 3.11 5/15/96 10:45

Local Site

In Alarm Status: NO

Fiber A Threshold Alarm Active: NO

Error Rate: E-99 Today's Max: 5/15/96 11:58 Error Rate: E-7

Super Loop 1 NORMAL Super Loop 21 INACTIVE

To display far-end (distant) link status:**FI::> D S D**

Distant End Ready

Distant Status

Enter 'S' to Cancel Function

D S

Fiber Remote IPE S/N 2502-R3 Software Version 3.11 5/15/96 10:45

Remote Site

In Alarm Status: NO

Fiber A Threshold Alarm Active: NO

Error Rate: E-99 Todays Max: 5/15/96 11:58 Error Rate: E-10

Super Loop 1 NORMAL Super Loop 21 INACTIVE

After the communication with the distant site has been verified, you can display the current Fiber Remote Multi-IPE Interface configuration parameters to decide which parameters should be changed to meet the system requirements.

To display the near-end current Fiber Remote Multi-IPE Interface configuration:**FI::> D C**

Fiber Remote IPE S/N 2502-R3 Software Version 3.11 5/15/96 10:45

Local Site

Alarm Enabled: YES Self Clearing Enabled: YES

Remote XSM Address 0X00

Current Fiber Alarm Threshold Value E-9

Current Dip Switch Settings (S1...S8) ON ON OFF OFF OFF OFF OFF OFF

2400 Baud Single Terminal Mode Multidrop Address 0

To display the far-end (distant) current Fiber Remote Multi-IPE Interface configuration:

FI::> D C D

Distant End Ready

Distant Configuration

Enter 'S' to Cancel Function

D C

Fiber Remote IPE S/N 2502-R3 Software Version 3.11 5/15/96 10:45

Remote Site

Alarm Enabled: YES Self Clearing Enabled: YES

Remote XSM Address 0X00

Current Fiber Alarm Threshold Value E-9

Current Dip Switch Settings (S1...S8) ON ON OFF OFF OFF OFF OFF
OFF

2400 Baud Single Terminal Mode Multidrop Address 0

To change the fiber-optic link alarm threshold, execute the **S A** command on the MMI terminal. This sets the bit error per minute alarm threshold for the link.

To configure the fiber-optic link alarm thresholds:

FI::> S A

Alarm Threshold: Current Value E-9 New Value E-10

Alarm Threshold—Number of bit errors per minute. E-6 represents 10^{-6} or 1 error in 1 million bits or 3000 error bits/min, E-7 represents 10^{-7} or 1 error in 10,000,000 bits or 300 error bits/min, E-8 represents 10^{-8} or 1 error in 100,000,000 bits or 30 error bits/min, E-9 represents 10^{-9} or 1 error in 1,000,000,000 bits or 3 error bits/min, and E-10 represents 10^{-10} or 1 error in 10,000,000,000 bits or 1 error bits/min.

To configure site name, time, and date:

FI:: >	Prompt requesting an MMI command
FI::> S N	Set name
Change Site Name (YES or NO) Y	To change the site name
Enter Site Name= SC	New site name
Change Link Identifiers (YES or NO) Y	To change link IDs
ID for Superloop 1 004 1	Superloop and shelf number
ID for Superloop 2 008 1	Superloop and shelf number
ID for Superloop 3012 2	Superloop and shelf number
ID for Superloop 4016 2	Superloop and shelf number
FI::> S T	To set time
Current Time 10:06:14 10:15:25	Enter correct time at the cursor, if required.
Current Time 10:15:25	
FI::> S D	To set date
Current Date 8/10/95 18/11/95	Enter correct date at the cursor, if required.
Current Date 8/11/95	

Note: Time and date should be set correctly to allow correlation of the Remote IPE Alarm Log with error messages in the Meridian 1 History File.

Table 17 lists MMI commands used to display and configure carrier parameters such as setting alarm thresholds, setting time and date, configuring fiber-optic links, connecting to the SDI port, and testing the fiber-optic link and interfaces to the link.

Table 17
MMI commands used in displaying, checking, and setting the fiber-optic parameters (Part 1 of 3)

Command	Description
A D	Alarm disable. Disables all alarms.
A E	Alarm enable. Enables all alarms.
C A	Clear alarm. Clears all alarms and resets the fiber-optic link bit error rate counters.

Table 17
MMI commands used in displaying, checking, and setting the fiber-optic parameters (Part 2 of 3)

Command	Description
D C [P]	Display configuration. Displays current near-end configuration such as time, date, name, and link bit error threshold.
D C D	Display configuration [Pause]. Displays current far-end configuration such as time, date, name, and link bit error threshold.
D S [P]	Display status [Pause]. Displays near-end superloop and fiber-optic link status.
D S D	Display status distant. Displays far-end superloop and fiber-optic link status.
H or ?	Help. Displays the help screen.
HOST or HO	Connect the terminal to the SDI port. The password is HOST . Enter password in all capital letters.
L	Log into the MMI terminal for one Fiber Remote Multi-IPE Interface. The password is FIBER .
L xx	Log into a specific superloop when the system has more than one Fiber Remote Multi-IPE Interface connected in a daisy-chain, where xx is the Fiber Remote Multi-IPE Interface address in the chain. The password is also FIBER . Enter password in all capital letters.
Q	Logs the terminal user out.
S A	Set link bit error per minute alarm threshold.
S C	Set alarm self-clearing function to either "enable" or "disable".
S D	Set date or verify current date.
S L	Sets link. Configures which fiber-optic link (A or B) is selected to transmit data.

Table 17
MMI commands used in displaying, checking, and setting the fiber-optic parameters (Part 3 of 3)

Command	Description
S N	Set name. Sets the name for the site and superloop number and shelf number. The site name can be 9 characters long and the superloop number can be 3 characters long and shelf can be one to two characters long.
S T	Set time or verify current time.
T A	Test all. Initiates a series of pre-programmed tests on the near and far end superloops and fiber-optic links. Test duration can be set from 1 to 98 minutes. By entering 0, the tests run one time. To stop testing enter STOP .
T FI	Test fiber. Initiates a series of pre-programmed tests on the fiber-optic links. Test duration can be set from 1 to 98 minutes. By entering 0, the tests run one time. To stop testing enter STOP .
T SL	Test near-end superloop. Initiates a series of pre-programmed tests on the near-end superloops. Test duration can be set from 1 to 98 minutes. By entering 0, the tests run one time. To stop testing enter STOP .
T SL D	Test far-end superloop. Initiates a series of pre-programmed tests on the far-end superloops. Test duration can be set from 1 to 98 minutes. By entering 0, the tests run one time. To stop testing enter STOP .
@@@	Terminates the terminal connection